BM3Plus User's Manual

Patient Monitor

Rev. 1.0

Bionet

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Menu Selection

Menu Composition

1.1 CE Standard Information

Electromechanical safety standards met:

- EN 60601-1: 1990 + A1:1993 + A2: 1995 Medical Electrical Equipment, Part 1, General Requirements for Safety.
- IEC/EN 60601-1-2 :2001 Electromagnetic compatibility -Requirements and tests.
- EN 1060-1:1995 Non-invasive sphygmomanometers - Part 1: General requirements
- EN 1060-3:1997 Non-invasive sphygmomanometers - Part 3: Supplementary requirements for electro-mechanical blood pressure measuring systems
- EN ISO 9919:2005 Medical electrical equipment - Particular requirements for the basic safety and essential performance
of pulse oximeter equipment for medical use (ISO 9919:2005)
- EN 60601-2-27:2006 Medical electrical equipment - Part 2-27: Particular requirements for the safety, including essential performance,
of electrocardiographic monitoring equipment
- EN 60601-2-30:2000 Medical electrical equipment - Part 2-30: Particular requirements for the safety, including essential performance,
of automatic cycling non-invasive blood pressure monitoring equipment
- EN 12470-4:2000 Clinical thermometers - Part 4: Performance of electrical thermometers for continuous measurement
- EN 60601-2-49:2001 Medical electrical equipment - Part 2-49: Particular requirements for the safety of multifunction patient monitoring equipment

1.2 Read before Use

BIONET services are always available to you.

The following are addresses and phone numbers for information, services, and product supplies.

How to Contact Us

Product Supply Information	**Bionet America Inc.** 2691 Dow Ave Ste B Tustin, CA 92780 Phone : 714-734-1760 Fax : 714-734-1761 E-mail : sales@bionetUS.com,
Consumable Supplies Request	Phone : 714-734-1760 - USA Phone : 82-2-6300-6477 - Intenational
A/S and Technical Support	For any technical inquiries or repair on the equipment, Phone : 714 -734-1760 E-mail : service@bionetUS.com
Home Page	URL : http://wwwbionetUS.com

※In the event of malfunction or failure, contact us along with the model name, serial number, and product name of the equipment.

※ If you need the supply circuit diagram, component list, description and calibration instruction etc. you can contact us and we will provide you with it.

Warranty Period

- This product is manufactured and passed through strict quality control and through inspection.

- We provide a 1-year warranty period for main body, with 6 months warranty for accessories.

- We will repair or replace any part of the BM3Plus found to be defective in usual operating circumstance for free to you.

- This warranty does not apply to any defect caused by improper use, misuse or abuse.

Warning, Caution, Note

For special emphasis on agreement, terms are defined as listed below in user's manual. Users should operate the equipment according to all the warnings and cautions.

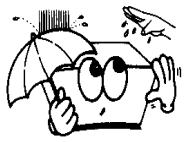
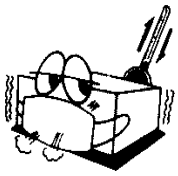
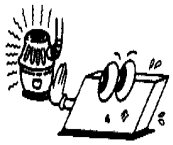
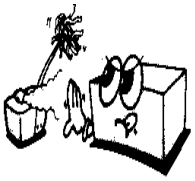
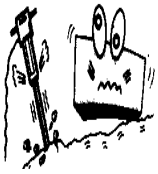
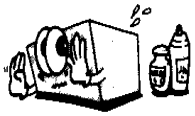
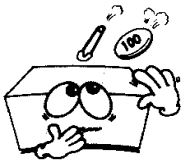
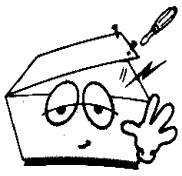
Warning
To inform that it may cause serious injury or death to the patient, property damage, material losses against the "warning" sign

Caution
To inform that it may cause no harm in life but lead to injury against the "caution" sign

Note
To inform that it is not dangerous but important "note" sign for proper installation, operation, and maintenance of the equipment.

General Precaution on Environment

- Do not keep or operate the equipment in the environment listed below.

	Avoid placing in an area exposed to moisture. Do not touch the equipment with wet hands.		Avoid exposure to direct sunlight
	Avoid placing in an area where there is a high variation of temperature. Operating temperature ranges from 10(C to 40(C. Operating humidity ranges from 30% to 85%.		Avoid using or storing in the vicinity of Electric heaters
	Avoid placing in an area where there is an excessive humidity rise or ventilation problem.		Avoid placing in an area where there is excessive shock or vibration.
	Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.		Avoid inserting dust and especially metal materials into the equipment
	Do not disjoint or disassemble the equipment. We take no responsibility for your actions.		Keep the power off when the equipment is not fully installed. Otherwise, equipment could be damaged.

CAUTIONS

Before Installation

Compatibility is critical to safe and effective use of this device. Please contact your local sales or service representative prior to installation to verify equipment compatibility.

Defibrillator Precaution

Patient signal inputs labeled with the CF and BF symbols with paddles are protected against damage resulting from defibrillation voltages. To ensure proper defibrillator protection, use only the recommended cables and lead wires.

Proper placement of defibrillator paddles in relation to the electrodes is required to ensure successful defibrillation.

Disposables

Disposable devices are intended for single use only. They should not be reused as performance could degrade or contamination could occur.

Disposal

All accessories and/or waste related to this device must be disposed of according to all local regulations. You are responsible for knowing and complying with your local disposal procedures.

Electrocute Precautions

To prevent skin burns, apply electrocute electrodes as far as possible from all other electrodes, a distance of at least 15 cm/6 in. is recommended.

EMC

Magnetic and electrical fields are capable of interfering with the proper performance of the device. For this reason make sure that all external devices operated in the vicinity of the monitor comply with the relevant EMC requirements. X-ray equipment or MRI devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.

Also, keep cellular phones and other telecommunication equipment away from the monitor.

CAUTIONS

Instruction for Use

For continued safe use of this equipment, it is necessary that the instructions are followed. However, instructions listed in this manual in no way supersede established medical practices concerning patient care.

Loss of Data

Should the monitor at any time temporarily lose patient data, the potential exists that active monitoring is not being done. Close patient observation or alternate monitoring devices should be used until monitor function is restored.

If the monitor does not automatically resume operation within 60 seconds, power cycle the monitor using the power on/off switch. Once monitoring is restored, you should verify correct monitoring state and alarm function.

Maintenance

Regular preventive maintenance should be carried out annually (Technical inspections). You are responsible for any requirements specific to your country.

MPSO

The use of a multiple portable socket outlet (MPSO) for a system will result in an enclosure leakage current equal to the sum of all individual earth leakage currents of the system if there is an interruption of the MPSO protective earth conductor. Do not use an additional extension cable with the MPSO as it will increase the chance of the single protective earth conductor interruption.

Negligence

BIONET does not assume responsibility for damage to the equipment caused by improperly vented cabinets, improper or faulty power, or insufficient wall strength to support equipment mounted on such walls.

NOTES

Power Requirements

Before connecting the device to the power line, check the voltage and frequency. Ratings of the power line must be the same as those indicated on the unit's label. If this is not the case, do not connect the system to the power line until you adjust the unit to match the power source. In U.S.A, if the installation of this equipment will use 240V rather than 120V, the source must be a center-tapped, 240V, single-phase circuit.

Restricted Sale

U.S.A federal law restricts this device to sale by or on the order of a physician.

Supervised Use

This equipment is intended for use under the direct supervision of a licensed health care practitioner.

Ventilation Requirements

Set up the device in a location which affords sufficient ventilation. The ventilation openings of the device must not be obstructed. The ambient conditions specified in the technical specifications must be ensured at all times.

·Put the monitor in a location where you can easily see the screen and access the operating controls.

·This product is protected against the effects of cardiac defibrillator discharges to ensure proper recovery, as required by test standards. (the screen may blank during a defibrillator discharge but recovers within second as required by test standards.)

Interpretive Results

Interpretive results are intended only as guidance for the qualified physicians and must not be relied upon as diagnoses.

Reference Literature

Medical Device Directive 93/42/EEC

EN 60601-1/1990 +A1: 1993 +A2 : 1995 : Medical electrical equipment.

General requirements for safety

EN 60601-1-1/9. 1994 +A1 12.95: General requirements for safety.

General Precautions on Electrical Safety

Warning
Check the items listed below before operating the equipment.

1. Be sure that AC power supply line is appropriate to use. (AC100 - 240V)
2. Be sure that the power source is the one supplied from Bionet. (DC18V, 2.5A)
3. Be sure that the entire connection cable of the system is properly and firmly fixed.
4. Be sure that the equipment is completely grounded. (If not, this might cause a problem to occur in the product.)
5. The equipment should not be placed in the vicinity of electric generators, X-ray, broadcasting apparatus to eliminate electrical noise during operation. Otherwise, it may cause incorrect result.

Note
The Equipment should be placed far from generators, X-ray equipment, broadcasting equipment or transmitting wires, so as to prevent electrical noises from being generated during operation, When these devices are near the Equipment, it can produce inaccurate measurements. For BM3Plus, both independent circuit and stable grounding are essentially required. In the event that the same power source is shared with other electronic equipment, it can also produce inaccurate output.

Warning
Do not have contact with the patient while operating the machine. It may cause serious danger to the users. Use only the provided cable.

Warning
In case the Equipment does not operate as usual or is damaged, do not use on patient, and contact a medical equipment technician of the hospital or the equipment supply division.

Note
BM3Plus is classified as follows: - BM3Plus classifies as Class **I,** BF **&** CF concerning electric shock. It is not proper to operate this Equipment around combustible anesthetic or dissolvent. - Noise level is B class regarding IEC/EN 60601-1 and the subject of Nose is B level concerning IEC/EN60601-1-2.

Equipment Connection

Caution
In the hospital, doctors and patients are exposed to dangerous, uncontrollable compensating currents. These currents are due to the potential differences between connected equipment. The safety solution to the problem is accomplished with EN60601-1;1993.

Biocompatibility

When used as intended, the parts of the product described in this operator manual, including accessories that come in contact with the patient during the intended use, fulfill the biocompatibility requirements of the applicable standards. If you have questions about this matter, please contact BIONET or its representatives.

Maintenance and Washing Equipment Connection

There are various methods to clean the BM3Plus and its accessories. Please follow the methods mentioned below to avoid unnecessary damage or contamination to the Equipment.

We do not repair free of charge regardless of warranty period if it is contaminated or damaged with using dangerous material not approved for washing.

Cleaning Applied Parts

Cables and Leadwires

CAUTION
Do not use acetone or ketone solvents for cleaning; do not use an autoclave or steam cleaner.

Cables and leadwires can be cleaned with a warm, damp cloth and mild soap, or isopropyl alcohol wipes. For more intensive disinfecting (near sterile) Ethylene Oxide (ETO) is acceptable but will reduce the useful lifetime of the cable or leadwire.

CAUTION
The decision to sterilize must be made per your institution's requirements with an awareness of the effect on the integrity of the cable or leadwire.

Note
The Equipment needs a safety inspection once a year. Please refer to user's guide or service manual for the examine specifications.

Please check carefully both frame and sensor, after cleaning the Equipment, Do not use equipment that is worn out or damaged.

At least once a month, clean and wipe off the frame by using a soft cloth after wetting it with water and alcohol. Do not use lacquer, thinner, ethylene, or oxidizer which may lead to damage to the equipment.

Make sure both cables and accessories are free of dust or contaminants, and wipe them off with soft cloth wetted with warm water (40°), and at least once a week, clean them by using the clinical alcohol.

Do not submerge the accessories under any liquid or detergent. Also, make sure that no liquid penetrates into the Equipment or probes.

Caution
Do not dispose of single use probe in any hazard place, Always think about environmental contamination.

Caution
There is a back-up battery on board inside system. When users dispose this battery, Please conform to all local laws and regulations..

Warning
Check the electrodes of batteries before changing them.

· Operate BM3Plus with internal electric power supply when unsure of external ground connection or installation occur.

· Remove the battery when not using equipment for a while to avoid any damage.

For other applied parts such as temperature sensors, pulse oximetry probes, and NiBP cuffs, you must consult the manufacturer for cleaning, sterilization, or disinfecting methods.

1.3 Product Components

Product Outline

BM3Plus monitor is a product used for monitoring biological information and occurrence of a patient. Main functions of the product include displaying information such as ECG, respiration, SpO2, NIBP and temperature on its LCD screen and monitoring parameter, and alarming. It also prints out waves and parameters via a printer.

Principal Characters of Product

BM3Plus is a small-size multifunctional monitoring device for a patient designed for easy usage during movement. It features devices for hanging its handle from the patient's bed. The equipment also measures major parameters such as ECG, SpO2, NIBP, temperature and pulse, displaying it on a 7-inch color LCD screen. It also enables users to check waves and parameters and other vital signs of a patient via the 58mm thermal printer and monitor the patient by the remote-controlled alarm system. It also enables to build a central monitoring system by linking devices used for separate patients so that one can monitor several patients at a time.

Warning
Use only the supplement accessories provided by us. Otherwise, patient and user may be exposed to danger.

Warning
BEFORE USE — Before putting the system into operation visually inspect all connecting cables for signs of damage. Damaged cables and connectors must be replaced immediately. Before using the system, the operator must verify that it is in correct working order and operating condition. Periodically, and whenever the integrity of the product is in doubt, test all functions.

Product Configuration

1. Main body of BM3Plus Monitor	1 EA
2. 3-Lead Patient Cable	1 EA (3CBL-400, 3WIRE-400)
3. ECG extension cable	1 EA
4. Disposable electrodes	10 EA (ECGSENS-400)
5. NIBP extension tube	1 EA (NBPCBL-400)
6. Adult cuff (25-35 Cm)	1 EA (ACUFF-400)
7. SpO2 extension cable	1 EA (SPCBL-400)
8. SpO_2 Probe (finger type, reusable)	1 EA (SPASENS-400)
9. DC Adaptor (MW160 made in AULT Co., Ltd.)	1 EA

Optional Products

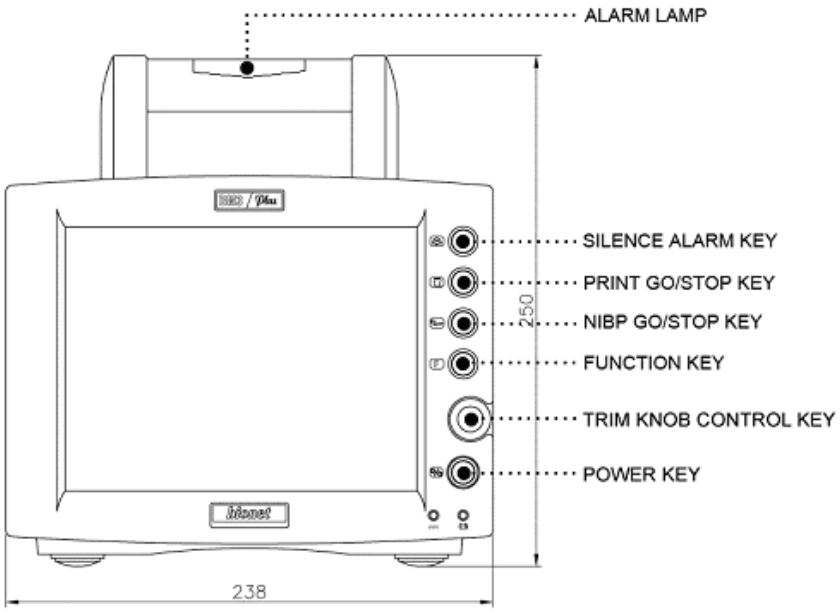
1. Temperature Probe (TEMPSENS-400)
2. Printer (PRN-400)
3. Chart Paper (PAPER-400)

Warning
In order to avoid electrical shock, do not open the cover. Disassembling of the equipment should be done only by the service personnel authorized by BIONET

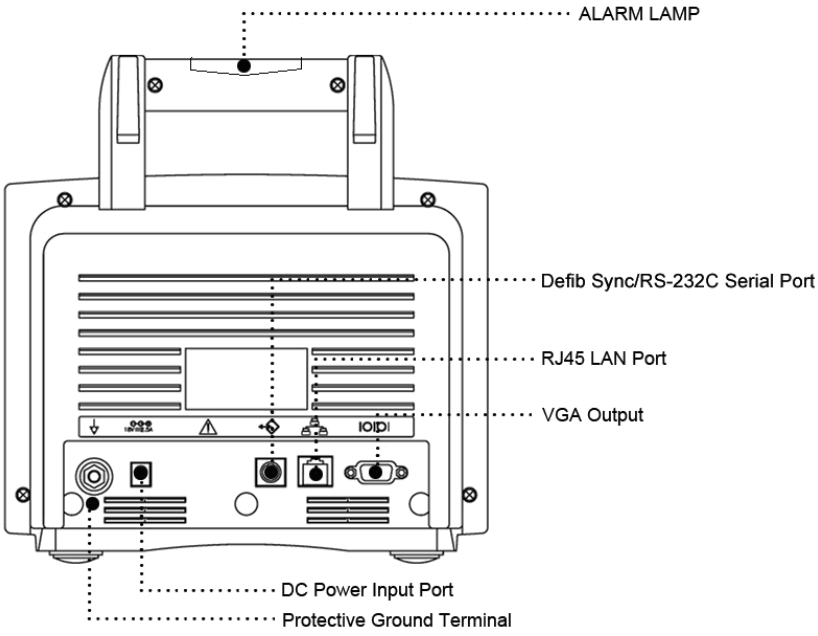
Warning
Users must pay attention on connection any auxiliary device via LAN port or nurse calling. Always consider about summation of leakage current, please check if the auxiliary device is qualified by IEC 60601-1, or consult your hospital biomedical engineer.

Product Body Configuration

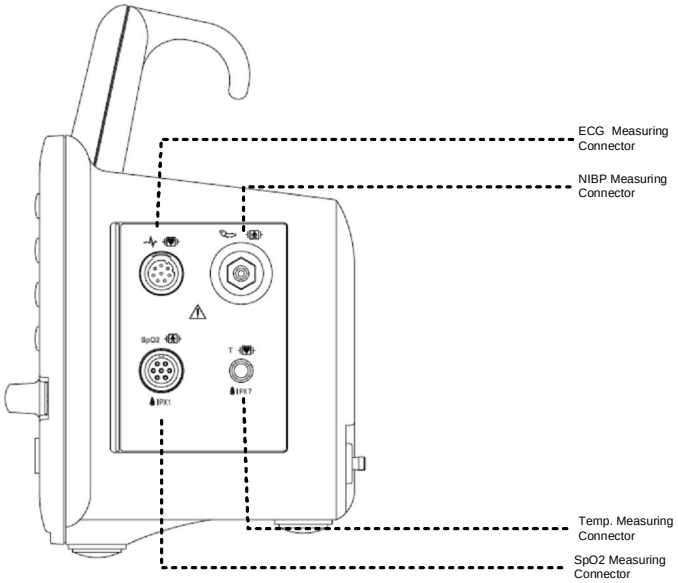
FRONT



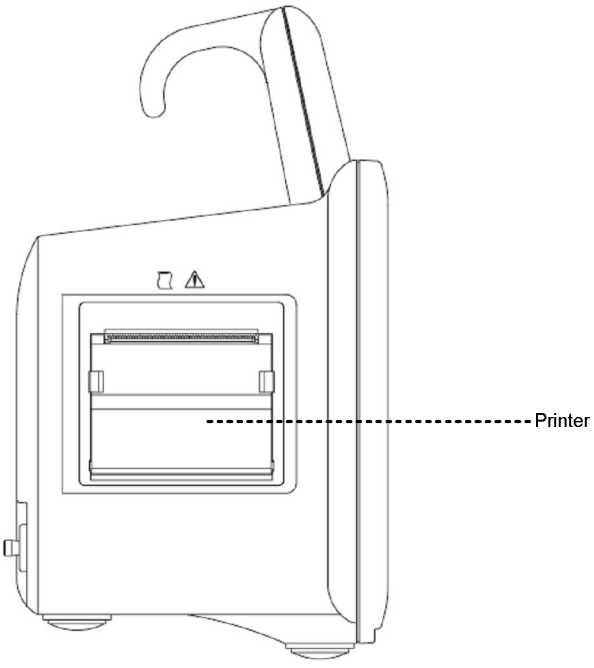
BACK



Right Side



Left Side



Accessories

ECG Cable +
Extension Cable

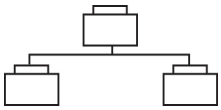
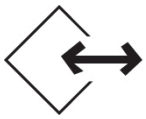
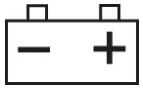
SpO_2 Cable +
Extension Cable

NIBP Cuff+
Extension cable

Temperature
sensor (Option)

Equipment Sign

	ATTENTION : Consult accompanying documents
	TYPE CF APPLIED PART : Insulated (floating) applied part suitable for intentional external and internal application to the patient including direct cardiac application. "Paddles" outside the box indicate the applied part is defibrillator proof. Medical Standard Definition : F-type applied part(floating/insulated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards to provide a higher degree of protection against electric shock tan that provided by type CF applied parts.
	TYPE BF APPLIED PART : Insulated (floating) applied part suitable for intentional external and internal application to the patient excluding direct cardiac application. "Paddles" outside the box indicate the applied part is defibrillator proof. Medical Standard Definition : F-type applied part (floating/insulated) complying with the specified requirements of IEC 60601-1/UL 2601-1/CSA 601.1 Medical Standards to provide a higher degree of protection against electric shock than that provided by type BF applied parts.

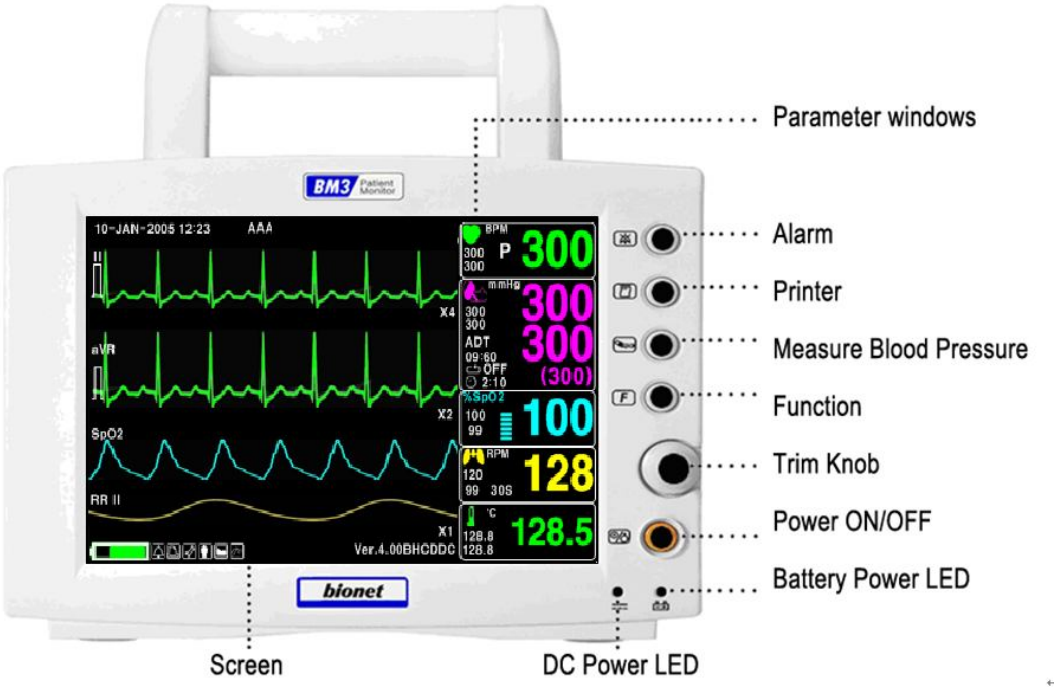
	Ground
	Printer
	Serial Port
	**LAN Port**
	**AUX Connector Port**
	DC Input Indicator
	**Battery Operation Indicator**
	DC Input Connector

	NIBP
	Temperature
	Function
	Power on
	Power off
	Respiration
	ECG
	Heart Pulse

1.4 Function and Key

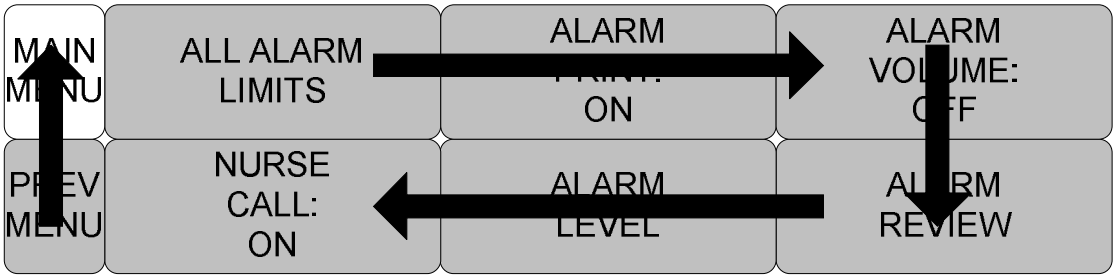
External Function

The front panel of this product consists of an LCD screen and five function keys and one trim knob.



Operation Key

1. Power : Switches on and off the Power.
2. Function Key
3. Blood Pressure：Manually completes measuring blood pressure.
4. Printer：Prints out the waves selected from the menu until the key is pressed to stop.
5. Alarm： Stop alarm sound.
   First press stops the current alarm for one minute
   Second press stops the all alarm for five minutes.
   Third press makes the alarm back to the original setting.
6. Trim Knob：This key is used to select menu by turning it clock or anticlockwise to move cursors.

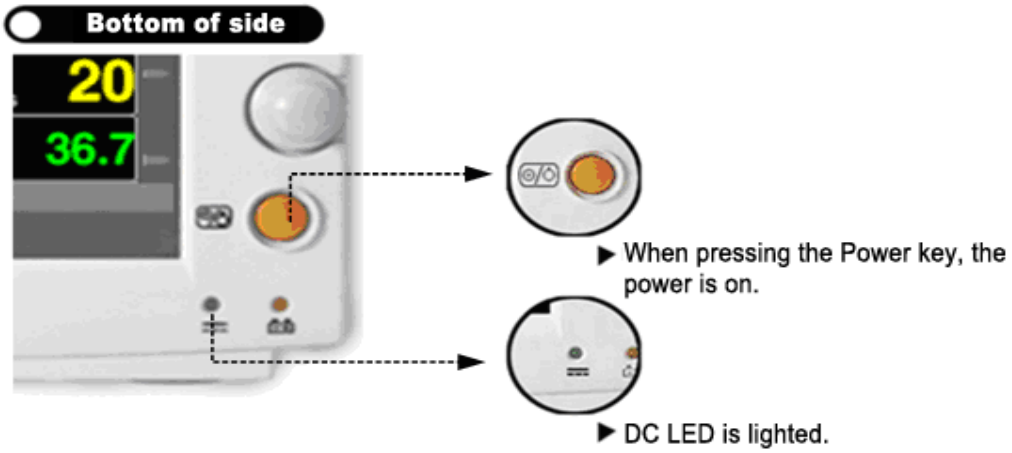

MAIN MENU
ALL ALARM LIMITS
ALARM PRINT: ON
ALARM VOLUME: OFF
PREV MENU
NURSE CALL: ON
ALARM LEVEL
ALARM REVIEW

1.5 Standard Power Supply Application

DC Power

DC Power LED is lighted on when the DC Power is plugged into the inlet at the back of the product.

A press of the power key makes the machine ready for use.



Warning
This equipment must only be connected to an outlet with protected earth.

1.6 Battery Power Supply Application

Battery power can be supplied for enabling portable use or for use during DC power failure.

Operation

1. Battery Power LED is lighted on when the machine is in use.

2. The DC/battery power is only sustainable for 1 hour.

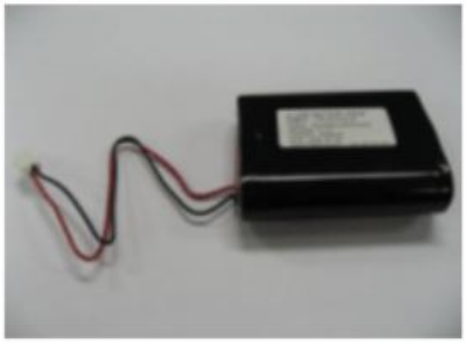
3. Battery is automatically charged when the machine is connected to DC Power Supply. Battery LED is lighted on after blinking.

4. The charging status of the batteries is displayed with 5 green boxes, each indicating a different charging

. (0% -> 25% -> 50% -> 75% -> 100%)

- Battery: LS1865L2203S1PMXZ(11.1V - 2200mA, Li-ion)

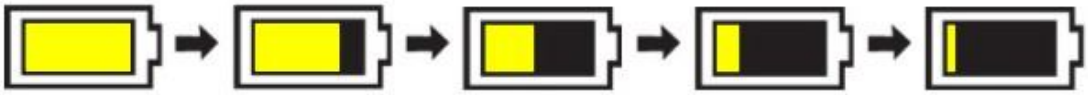
The Lithium-Ion battery is a rechargeable battery containing Lithium-Ion cells. Each battery contains an integrated electronic fuel gauge and a safety protection circuit.



5. The discharge condition of battery is indicated with on of 5 yellow boxes, each box showing a different level of charge available.

.

(100% -> 75% -> 50% -> 25% -> 0%)



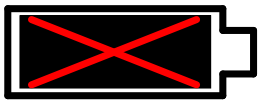
When the battery power remains 25%, the message of "Low Battery" is displayed. The power is automatically cut off after 5 minutes from the appearance of the message. The machine will no longer operate when the "Low Battery" indication is on. Charge the batteries with the power adaptor, which BIONET provided.

-Battery charging time: More than 6 hours

-Continuous battery use time: Lowest 1 hour to highest 2 hours continuous use (buffering)

Warning
Check the electrodes of batteries before charging them.

6. Battery status indication: When battery is disconnected from equipment or out of order, it is shown by a red `X' as shown below.



The Impact of Lithium-Ion Battery Technology on the Battery

The following are the key points you should know about Lithium-Ion battery technology:

The battery will discharge on its own, even when it is not installed in a monitor. This discharge is the result of the Lithium-Ion cells and the bias current required for the integrated electronics.

By the nature of Lithium-Ion cells, the battery will self-discharge.

The self-discharge rate doubles for every 10°C (18°F) rise in temperature.

The capacity loss of the battery degrades significantly at higher temperatures.

As the battery ages, the full-charge capacity of the battery will degrade and be permanently lost. As a result, the amount of charge that is stored and available for use is reduced.

Conditioning Guideline

The battery in the monitor should be fully charged and discharged every six months and condition it using the battery charger.

Storage Guideline

Store the battery outside of the monitor at a temperature between 20°C to 25°C (68°F to 77°F).

When the battery is stored inside a monitor that is powered by an AC power source, the battery cell temperature increases by 15°C to 20°C (59°F to 68°F) above the room's ambient temperature. This reduces the life of the battery.

When the battery is stored inside a monitor that is continuously powered by an AC power source and is not powered by battery on a regular basis, the life of the battery may be less than 12 months. BIONET recommends that you remove the battery and store it near the monitor until it is needed for transport.

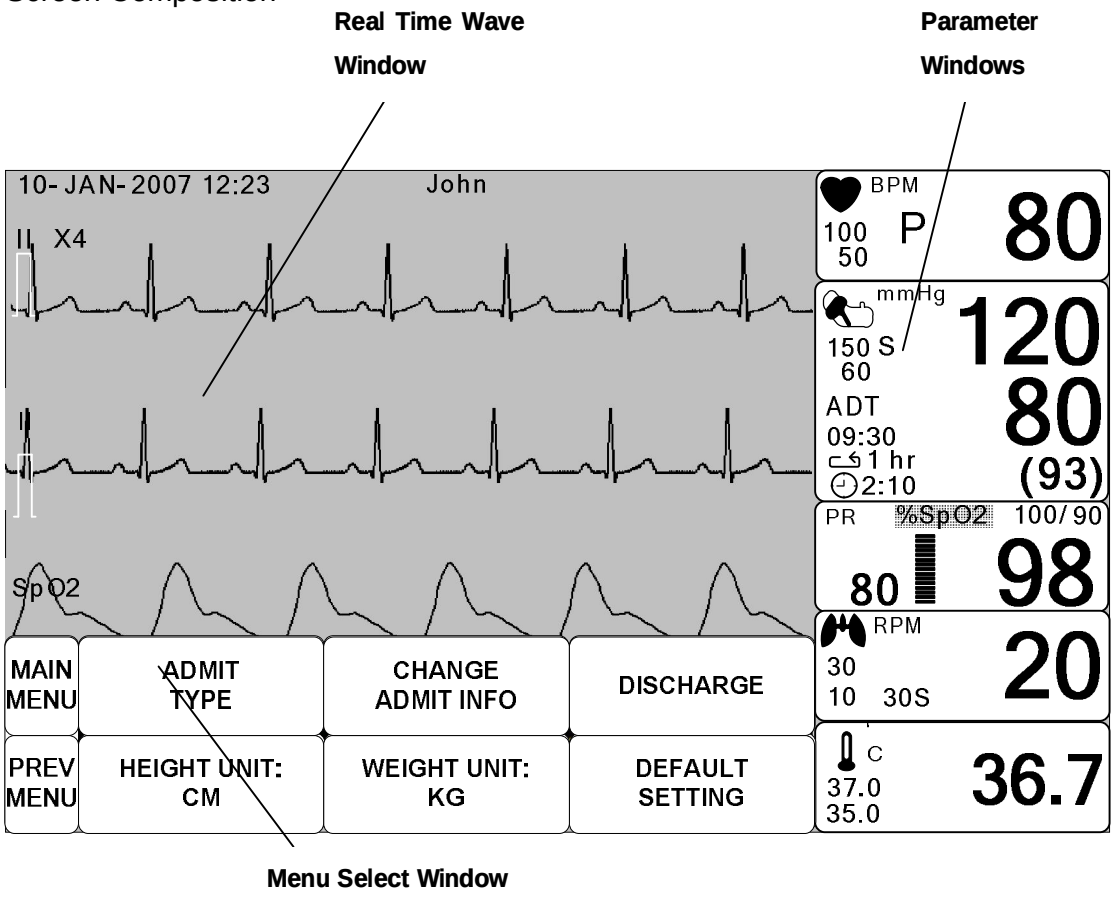
How to Recycle the Battery

When the battery no longer holds a charge, it should be replaced. The battery is recyclable. Remove the old battery from the monitor and follow your local recycling guidelines.

WARNING
EXPLOSION HAZARD DO NOT incinerate the battery or store at high temperatures. Serious injury or death could result.

1.7 General Menu Operation

Screen Composition

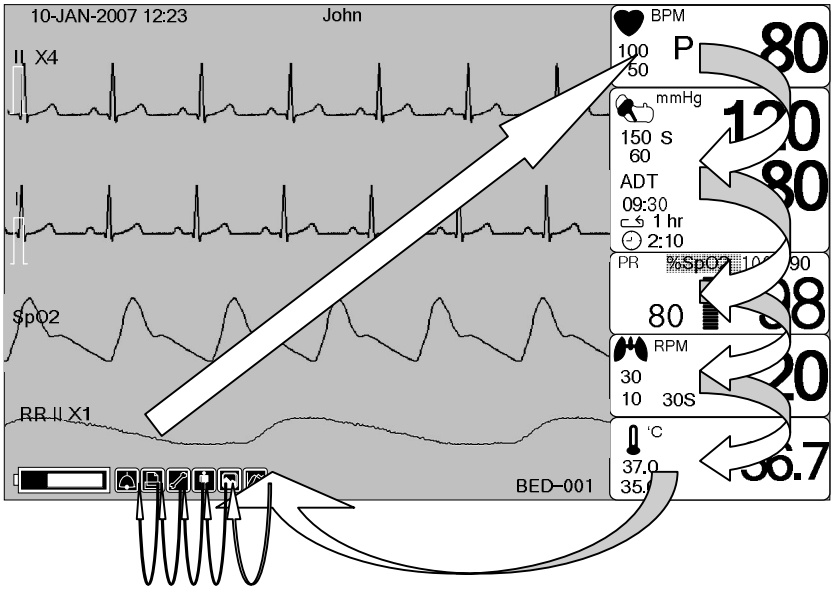


Real Time Wave Window：Displays measured results by up to three waves.

Menu Select Window：Menus appear when they are activated..

Parameter Window：Measured and setup data are displayed in five windows.

Menu Selection



Turn or press the knob.

When the Trim Knob Key is turned, menus are selected in the order indicated above. The above screen shows that the MORE menus is selected. The menus move to the right in the order of MORE MENU → ECG → NIBP →SpO_2 → RESP → TEMP.

Menu Composition

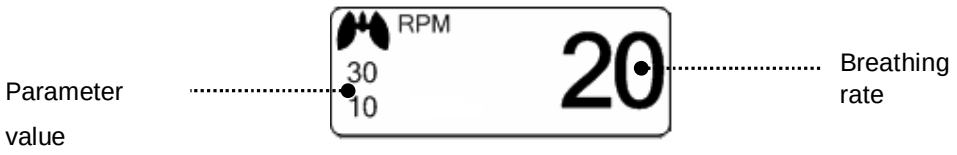
More Menu Window

When the additional menu is selected it will display your available options.

MAIN MENU	DISPLAY		USER SERVICE
PREV MENU		DEMO: ON	MAKER SERVICE

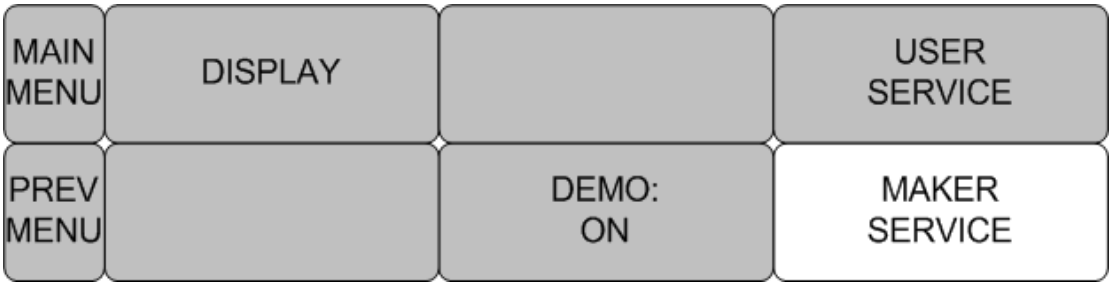
Numerical value sign widow

This window displays a measured parameter, function setup, and the boundary of parameter values.



Menu selection by using Trim Knob key

As the key is turned to the right, the menu selection moves clockwise. As the key is turned to the left, the menu selection moves counterclockwise. The menu selection is activated when you depress Trim Knob key.

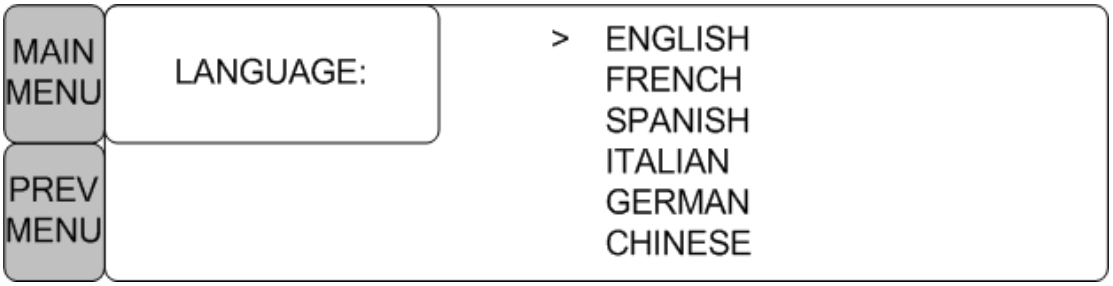


Menu selection with arrows

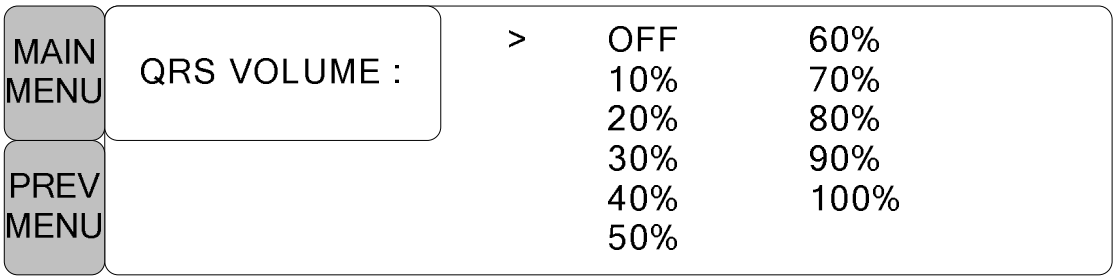
Upward Movement: Turns the Trim Knob key to the left.

Downward Movement: Turns the Trim Knob key to the right.

Selection is made by pressing the Trim Knob key. One exits the menu after the selection.

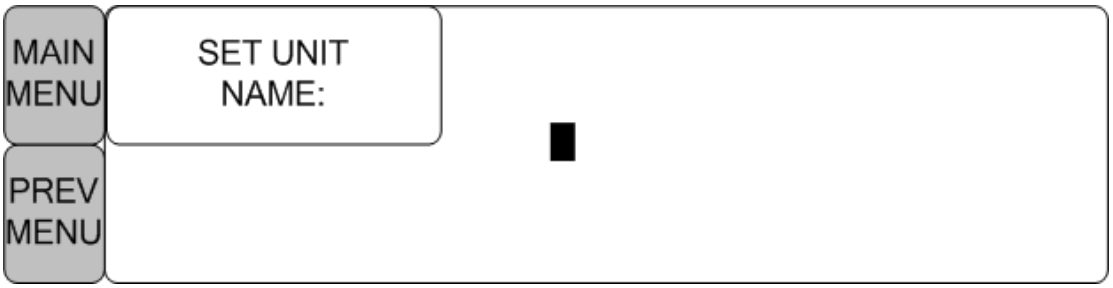


When moving within the quadrilateral, the text color reverses, and the numeric value applies immediately.

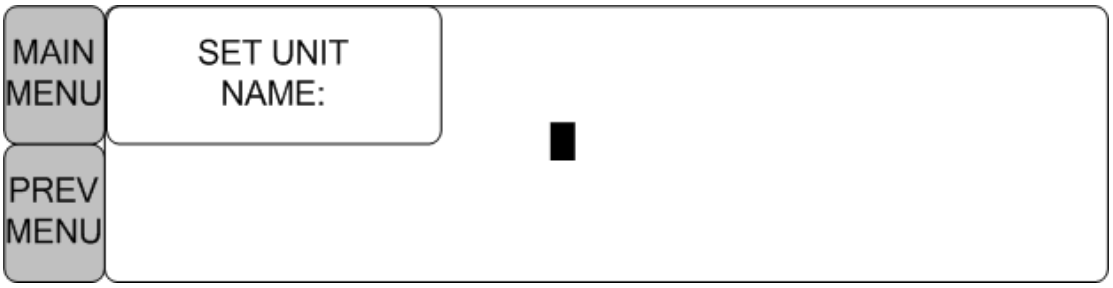


Word feature menu

The following figure shows the screen where the word sequence menu is activated within the word sequence correction menu. Here, the cursor moves over the words when the Trim Knob key is turned in the clockwise direction.



The above figure shows how the cursor moves on the screen. The cursor moves according to the direction the Trim Knob Key is turned. Press the Trim Knob key if you want to change a letter currently on the screen.

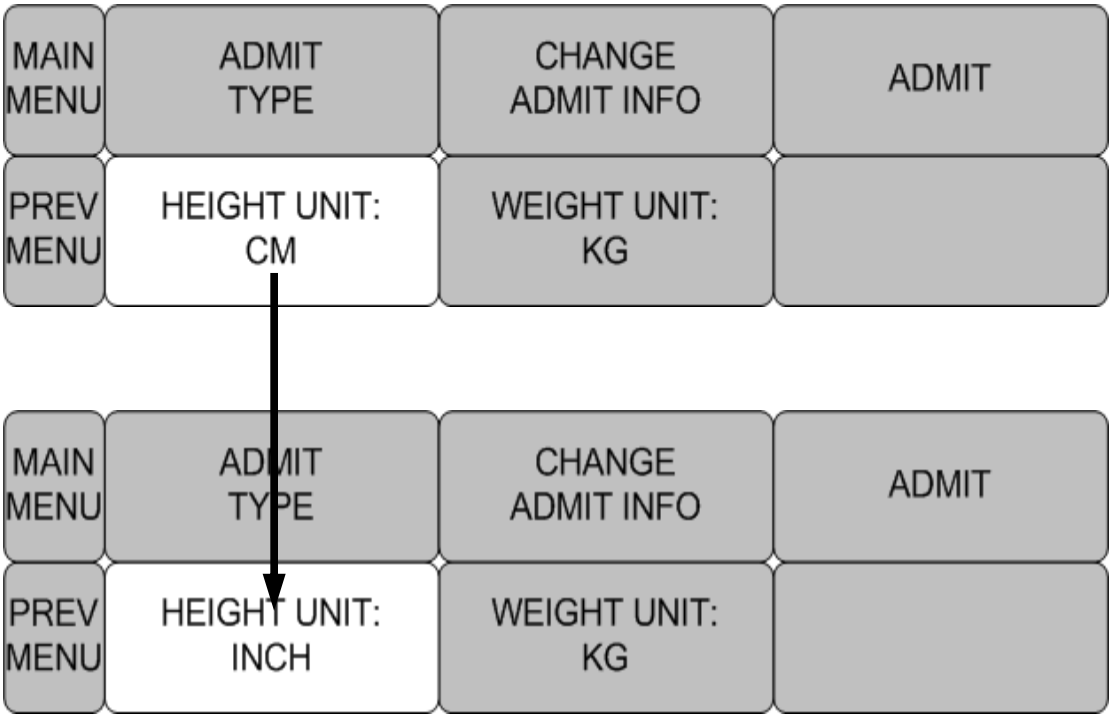


The above figure shows how the cursor is selected to change a letter. Right-hand turning of the Trim Knob Key makes it possible to select in the order of 0-9,A-Z, and a blank, while left-hand turning makes the movement in the opposite direction. Once a letter or a number is selected, the screen comes back to the condition where the same process of selection can be made. One may move to

the menu item in the left of the screen to end the process, which is completed by pressing Trim Knob Key. After completion, the screen comes back to the earlier picture.

Operation menu

The setup value changes without a selection when the menu is moved.



2. PATIENT/DATA MANAGEMENT

2.1 ADMIT

CHANGE ADMIT INFO

DISCHARGE

HEIGHT

WEIGHT

2.2 ALARM

ALL LIMITS

ALARM PRINT

ALARM VOLUME

ALARM LEVEL

ALARM REVIEW

ALARM LIST

SAVE ALARM LEVEL

NURSE CALL

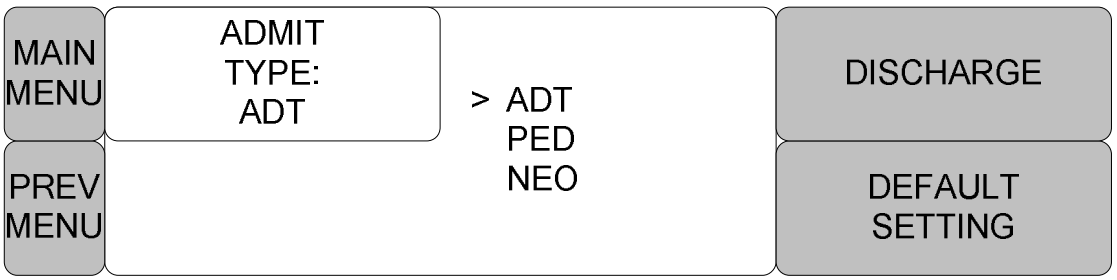
Additional setups are made for each parameter function. One can make an overall setup for the entire monitor system.

2.1 ADMIT

ADMIT TYPE
CHANGE ADMIT INFO
DISCHARGE
HEIGHT UNIT
WEIGHT UNIT
DEFAULT SETTING

ADMIT TYPE

Set the alarm limits environment of equipment in discharge status.



CHANGE ADMIT INFO

Last and first name (11 letters for each), sex (male or female), date of birth, weight, height, and patient ID (13 characters)

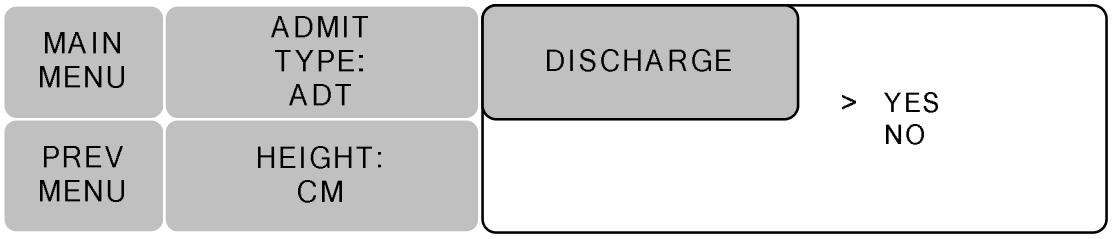
MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	DISCHARGE
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEAULT SETTING

CHANGE ADMIT INFORMATION

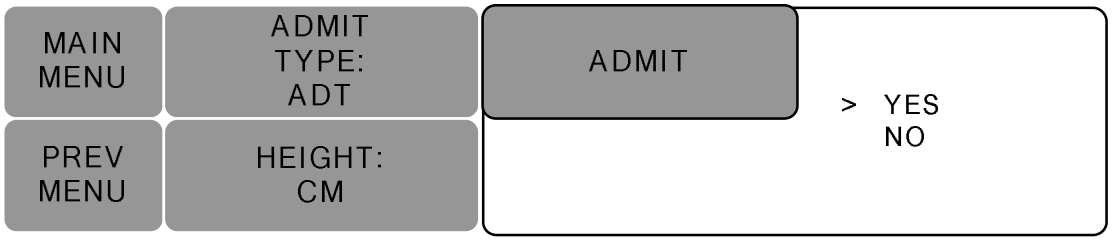
RETURN	CONTENTS
LAST NAME	JOHN
FIRST NAME	WASHINGTON
PATIENT ID	BM-001
SEX	MALE
BIRTH DATE	01 – JAN - 2007
AGE	30
HEIGHT	180cm
WEIGHT	80kg

DISCHARGE

Patient information and all numbers change to standard, and the screen displays, "ALL ALARMS OFF ADMIT PATIENT TO ACTIVE ALARMS."



ADMIT



HEIGHT

Unit of height is set as Cm / Inches.

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: KG	DEFAULT SETTING

WEIGHT

Unit of weight is set as Kg / LBS.

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: KG	DEFAULT SETTING

MAIN MENU	ADMIT TYPE : ADT	CHANGE ADMIT INFO	ADMIT
PREV MENU	HEIGHT UNIT: INCH	WEIGHT UNIT: LBS	DEFAULT SETTING

DEFAULT SETTING

Resets the Alarm Limit settings to factory defaults as in 12.DEFAULT SETTING VALUE section.

MAIN MENU	ADMIT TYPE: ADT	CHANGE ADMIT INFO	DISCHARGE
PREV MENU	HEIGHT UNIT: CM	WEIGHT UNIT: KG	DEAULT SETTING

2.2 ALARM

Alarm is divided into two, alarm for the patient's condition and for the product's condition.

The patient's alarm sounds when the diagnostic functions are detected. Each alarm sound differs in order and volume according to the levels of HIGH, MEDIUM, LOW and MESSAGE.

HIGH		-5	≡	300	≡		
MEDIUM		-3	≡	300	≡		
LOW		-1	≡	300	≡		
MESSAGE			≡	300	≡		

: Alarm sounds

≡ 300 ≡ : Number flashes

: Waves are printed out

: Alarm lamp flashes

Alarm for the Product

The machine gives alarm sounds for its system with a related message flashing.

LOW -1 ≡ Alarm Text ≡

ALARM LIMITS：The machine enables one to see and change the limits of alarm for all parameter functions.

ALARM PRINT：with an ON/OFF setup, the related information is printed out whenever an alarm is given.

ALARM VOLUME：volume of each alarm can be adjusted in 10 steps.

ALARM LEVEL：Priority of each parameter alarm can be set up.

ALARM REVIEW： Allows you to review previously saved alarm information and set the save status.

NURSE CALL： Set the ON/OFF feature of the NURSE CALL.

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

ALL LIMITS

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

ALL ALARM LIMIT

RETURN	UNITS	LOW	HIGH
HR	BPM	50	150
SPO2	%	90	100
PR	BPM	50	150
RESP	RPM	10	30
NIBP-S	mmHg	80	200
NIBP-M	mmHg	60	140
NIBP-D	mmHg	20	120
TEMP	°C	30.0	42.0

ALARM PRINT

Set ON/OFF functions automatically. When the alarm is activated the corresponding information is printed on heat sensitive paper.

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

ALARM VOLUME

Set the alarm volume to be set at 10 grades.

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: OFF	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	ALARM VOLUME :	> OFF	60%
		10%	70%
		20%	80%
PREV MENU		30%	90%
		40%	100%
		50%	

ALARM LEVEL

Set the order of priority in each alarm.

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	PARAMETER LEVEL		
PREV MENU			

PARAMETER LEVEL

PARAMETER ALARM LEVEL	
RETURN	ALARM LEVEL
HR	MEDIUM
SPO2-%	MEDIUM
SPO2-R	LOW
RESP	MESSAGE
NIBP-S	MEDIUM
NIBP-M	MEDIUM
NIBP-D	MEDIUM
TEMP	MESSAGE
LEAD FAULT	MESSAGE
LOW BATTERY	MESSAGE

ALARM REVIEW

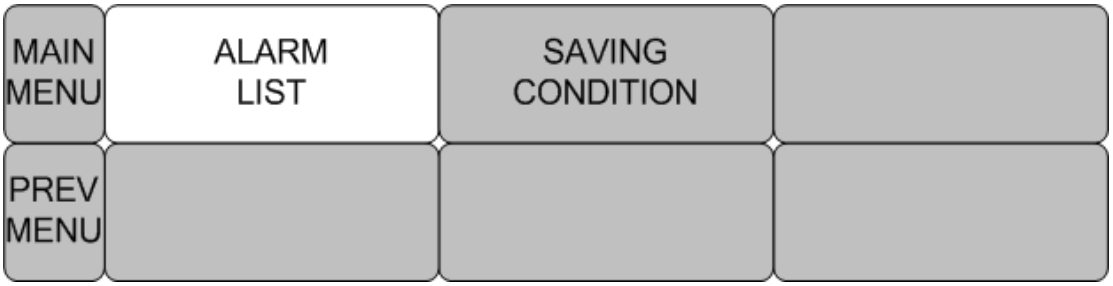
After an alarm is triggered the alarms and data wave pattern can be reviewed. Set up for priority of each parameter alarm.

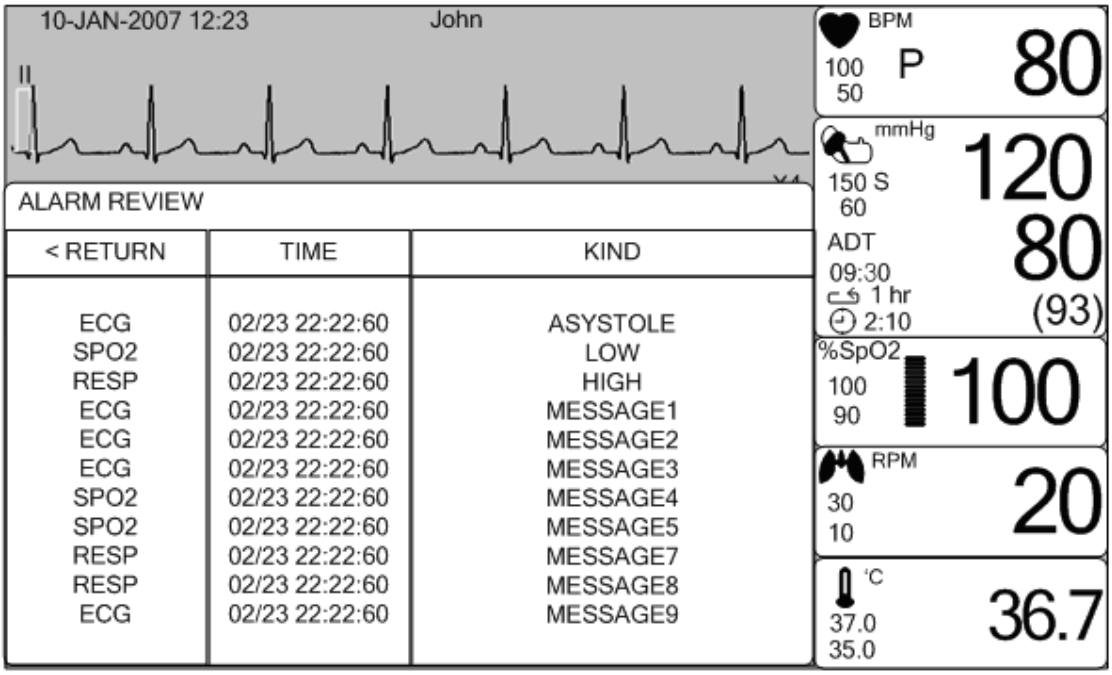
MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

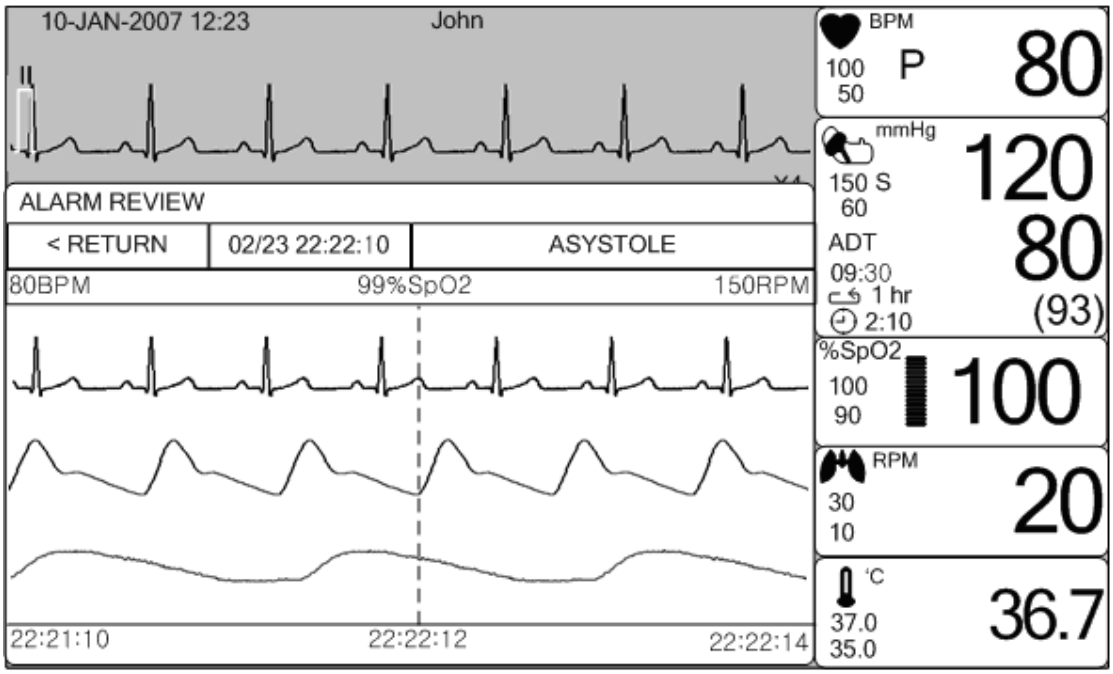
MAIN MENU	ALARM LIST	SAVING CONDITION	
PREV MENU			

ALARM LIST

When an alarm activates, this shows the order of the alarms.

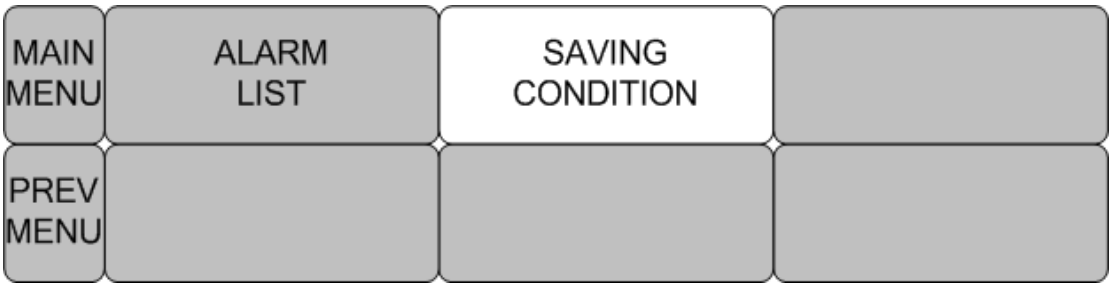


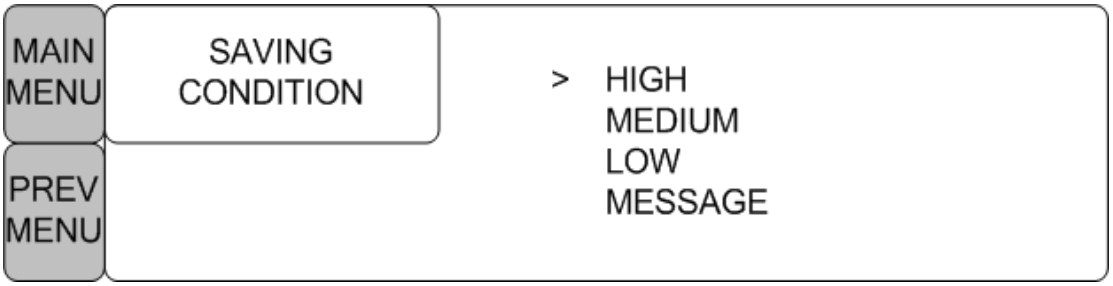




SAVING CONDITION

This determines the order in which triggered alarms are saved.





NURSE CALL

When an alarm is triggered, this activates the NURSE CALL function.

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: ON	ALARM LEVEL	ALARM REVIEW

MAIN MENU	ALL ALARM LIMITS	ALARM PRINT: ON	ALARM VOLUME: OFF
PREV MENU	NURSE CALL: OFF	ALARM LEVEL	ALARM REVIEW

3. SETUP

3.1 SETUP

DISPLAY

DEMO

USER SERVICE

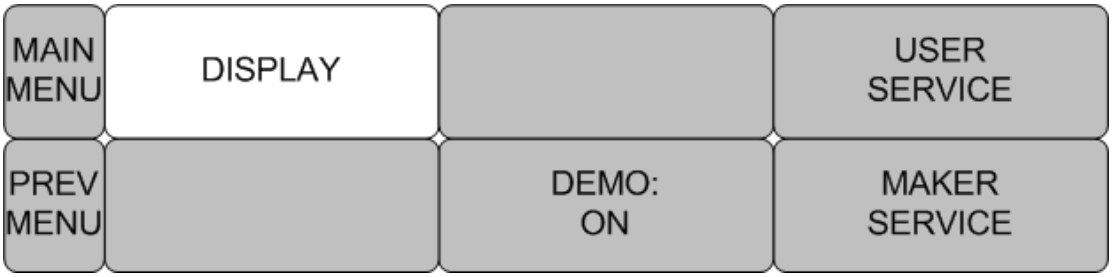
MAKER SERVICE

3.1 SETUP

DISPLAY : screen set menu

USER SERVICE : This is the menu to set the connection used to interface with an external computer

MAKER SERVICE : This is the basic adjustment menu used to adjust the features of this product.



DISPLAY

SET PARA：Select measurement parameters.

WAVE SELECT：Set wave pattern source at the bottom of the WINDOW in LARGE PARAMETER MODE.

SET DATE & TIME: Set and change date and time.

HR/PR SELECT：Set and select HR/PR source.

COLOR SELECT: Set screen display color.

SET SWEEP: Set speed of ECG, RESP WAVE DISPLAY

SET PARA

Select measurement function to use

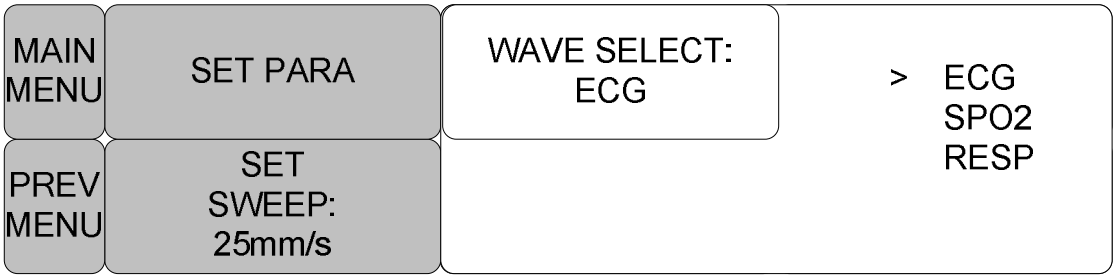
MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SET SWEEP: 25mm/s		HR/PR SELECT: ECG

PARAMETER WINDOW SET	
> RETURN	WINDOW ON/OFF
AUTO	ON
ECG	ON
SPO2	ON
RESP	OFF
NIBP	OFF
TEMP	ON

WAVE SELECT

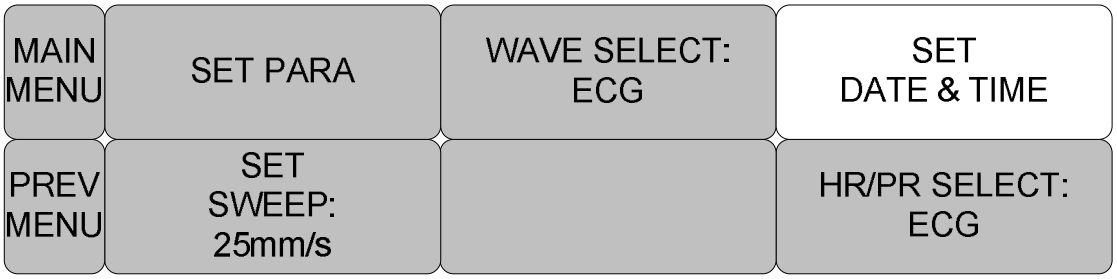
Select waveform to display in large parameter display.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SET SWEEP: 25mm/s		HR/PR SELECT: ECG



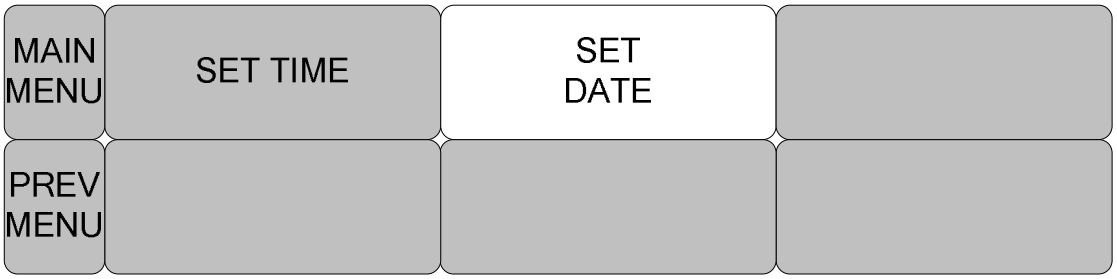
SET DATE & TIME

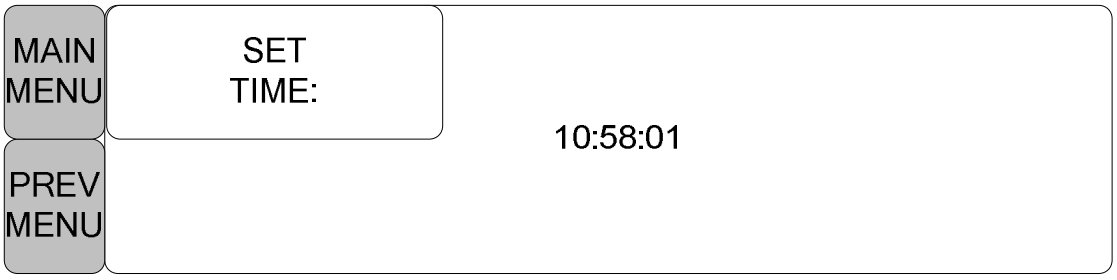
It has sub menu to set date and time.



SET TIME

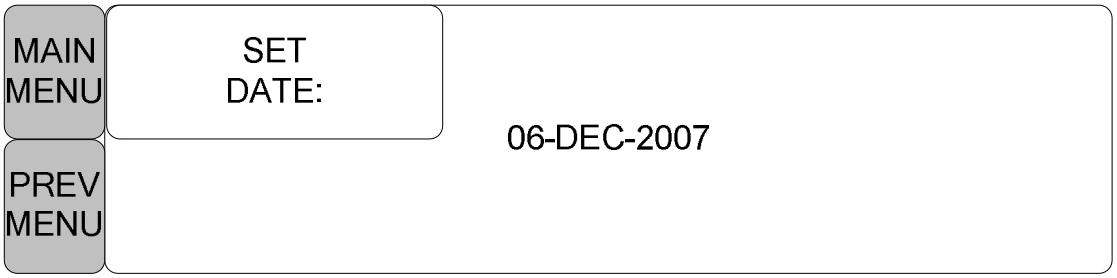
Set time of equipment.





SET DATE

Set date of equipment



HR/PR SELECT

This menu is used to set the source that displays heart and pulse rate.

The source can be selected between ECG and SPO2.

SET SWEEP

Set speed of drawing wave signal pattern in this widow.

MAIN MENU	SET PARA	WAVE SELECT: ECG	SET DATE & TIME
PREV MENU	SET SWEEP: 25mm/s		HR/PR SELECT: ECG

MAIN MENU	SET SWEEP:	> 6.25 mm/s 12.5 mm/s 25 mm/s 50 mm/s	SET DATE & TIME
PREV MENU			HR/PR SELECT: ECG

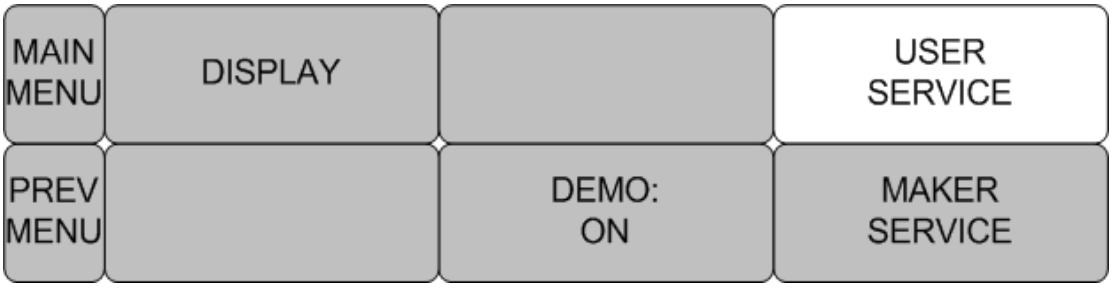
DEMO

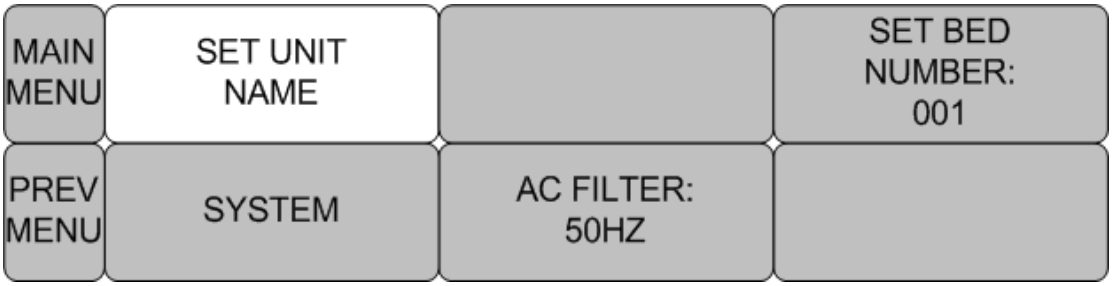
Set ON/OFF DEMONTRATION of equipment.

MAIN MENU	DISPLAY		USER SERVICE
PREV MENU		DEMO: ON	MAKER SERVICE

USER SERVICE

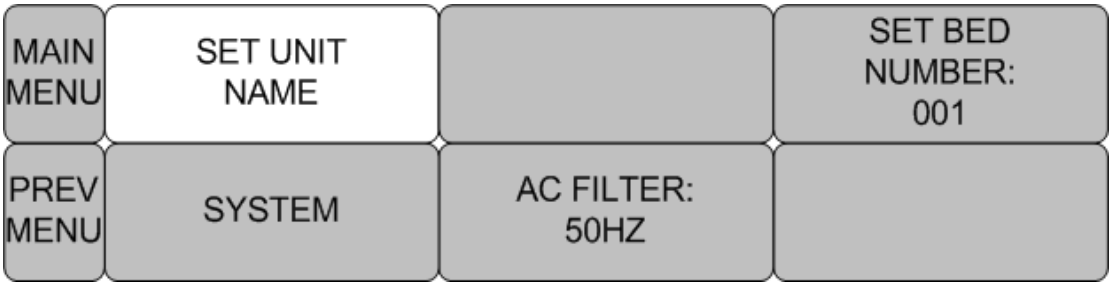
The user is able to set the communication parameters, power supply filter, and unit identification.

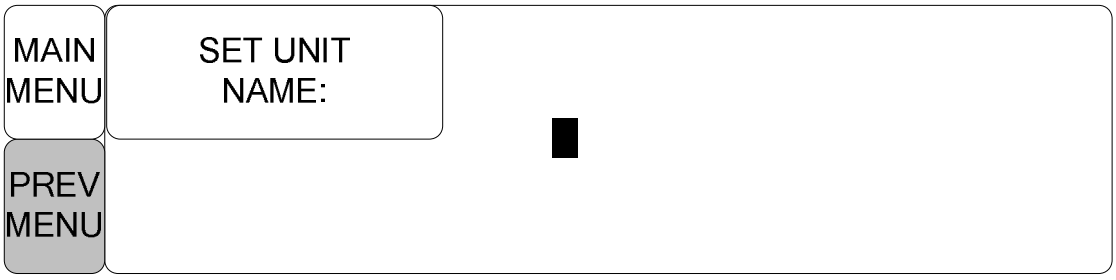




SET UNIT NAME

Set up for Equipment name.

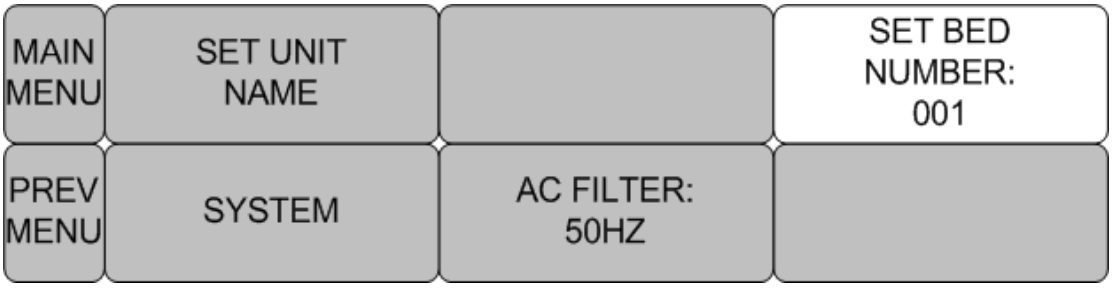


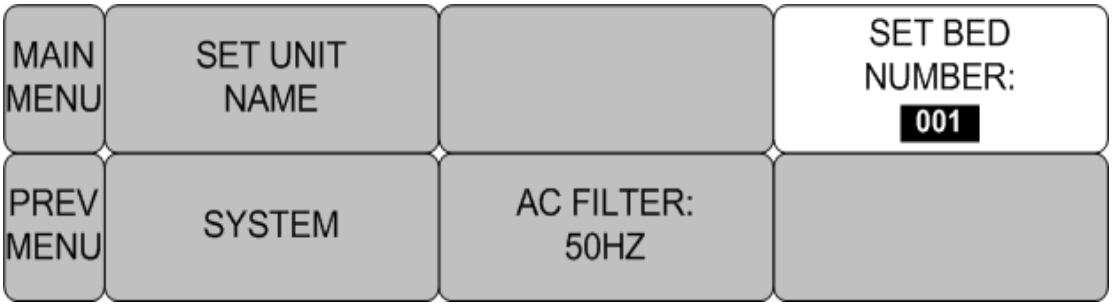


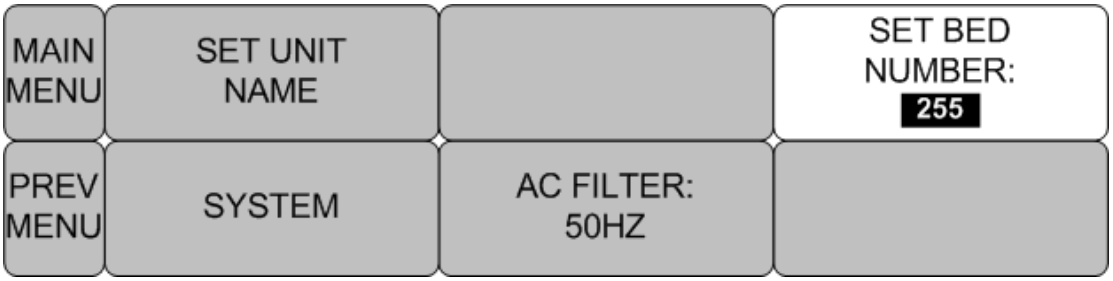
SET BED NUMBER

Set up for patient bed number.

Allowable settings are from 1 to 255.

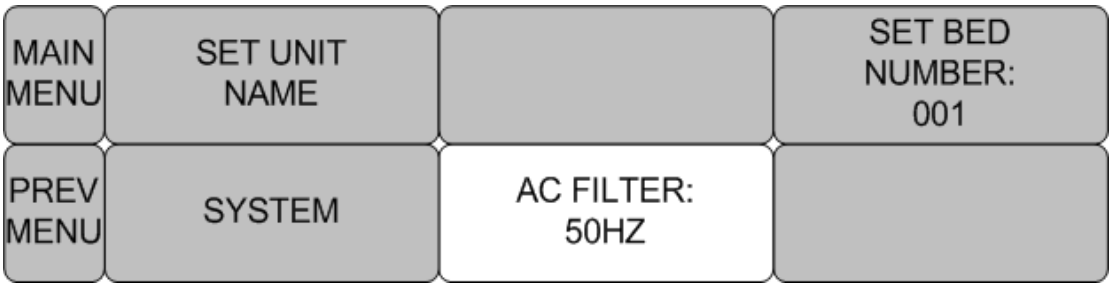


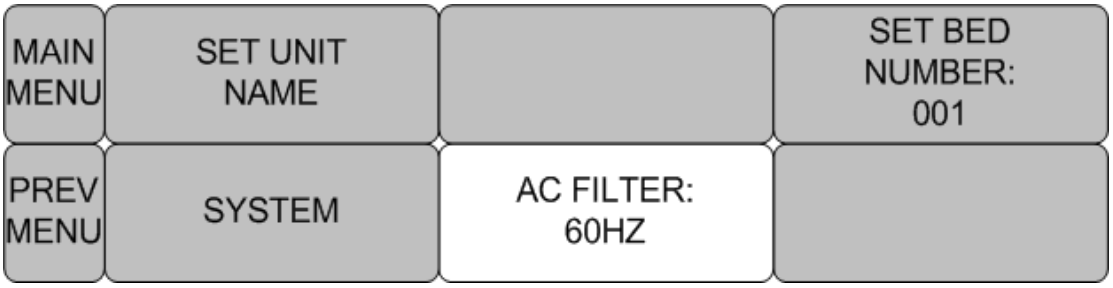




AC FILTER

AC FILTER is function where you can set power supply frequency. This feature is required because power supply frequency can be different from one country to another. . (The selectable frequencies are 50Hz and 60Hz.)





SYSTEM

System able to adjust and verify Equipment version information and system information

SYSTEM INFO SET	
RETURN	CONTENTS
MAIN VER	1.00BHCDDCX
CENTRAL	OFF
HOST IP	192.168. 30.100
DEVICE IP	192.168. 30.101
SUBNET	255. 255. 255. 0
GATEWAY	192.168. 30. 1
MAC ADD	00: 02: BD: 80: 00: 00
DISPLAY	LCD

MAKER SERVICE

Maker service is a menu used by manufacturers.

4. TREND

4.1 TREND

GRAPHIC TREND

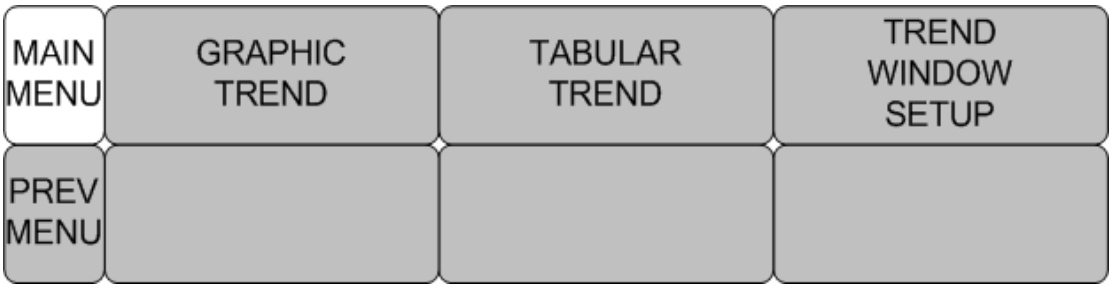
TABLE TREND

TREND WINDOW SETUP

4.1 TREND

TREND shows saved data graphically displayed with numeric values.

Real-time data recording duration is 1 minute. Amount of saving time for this data will be for 128hours.



: Move to main screen

: Move within the tables

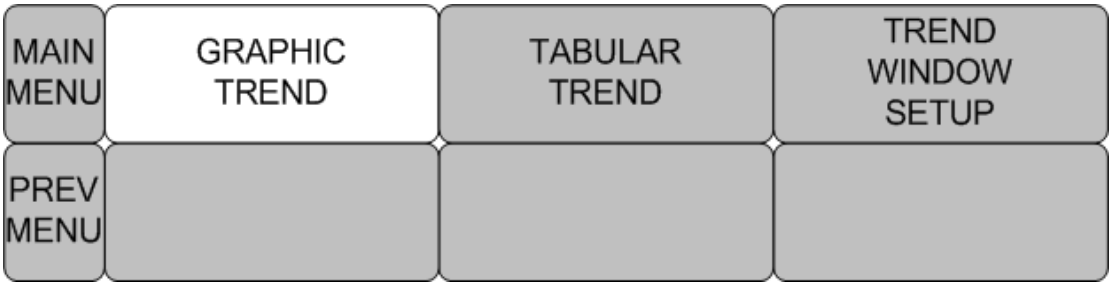
: Move up to other analysis function

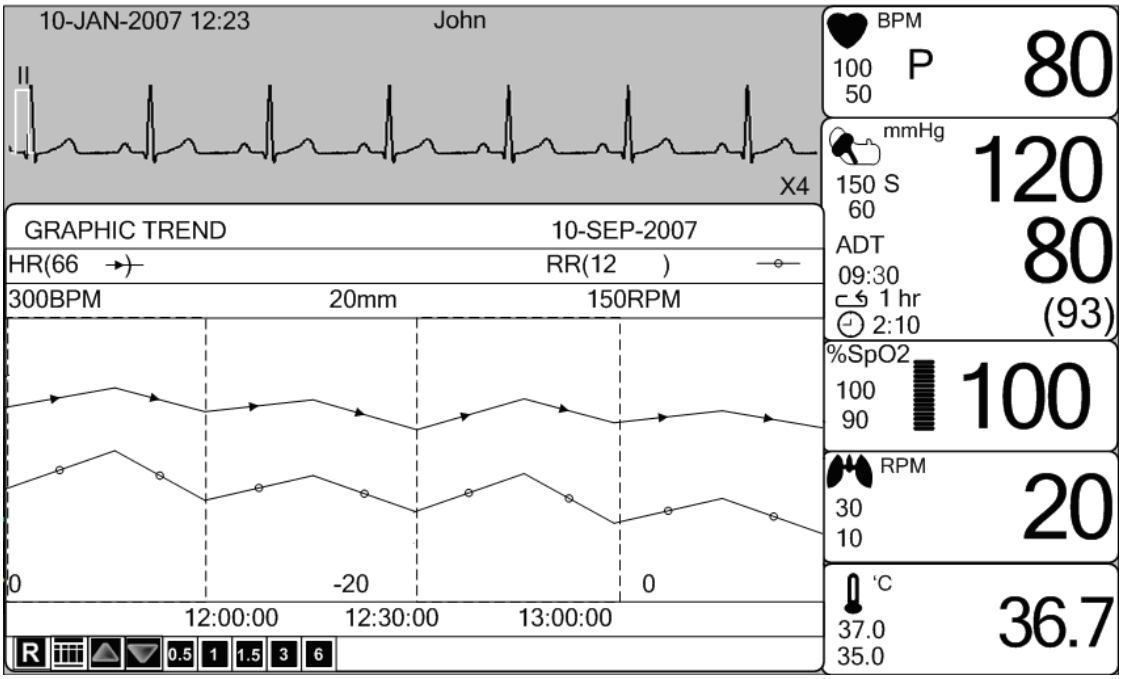
: Move down to other analysis function

: Time period set menu

GRAPHIC TREND

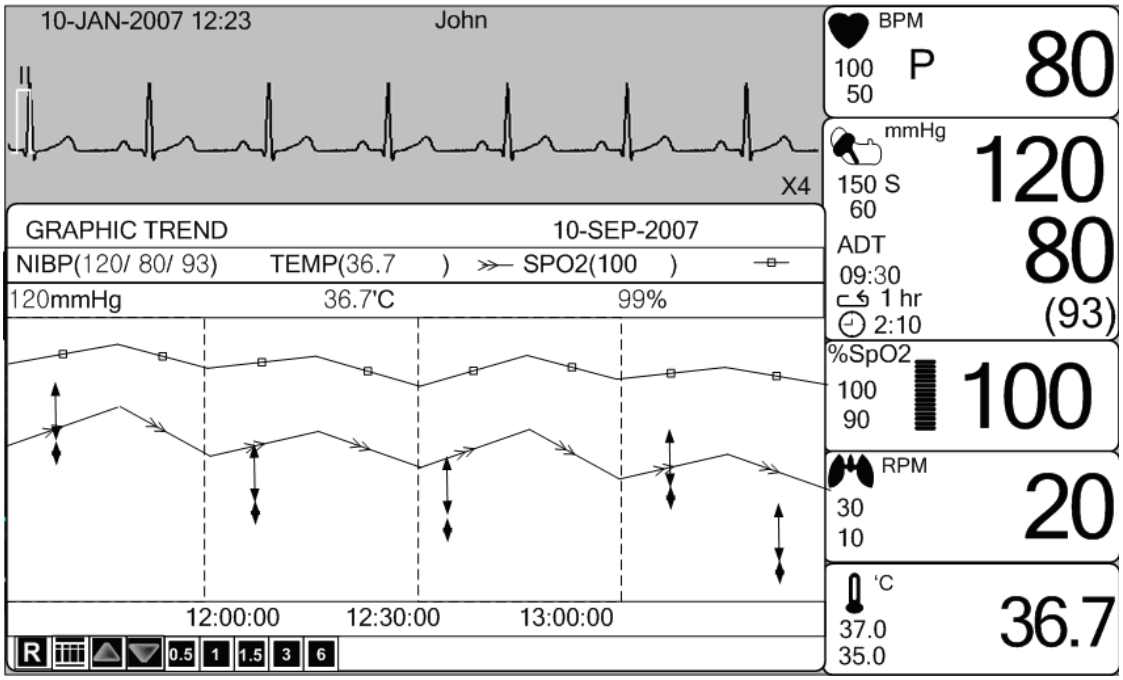
Wave Data can be stored and seen according to section.





TIME PERIOD

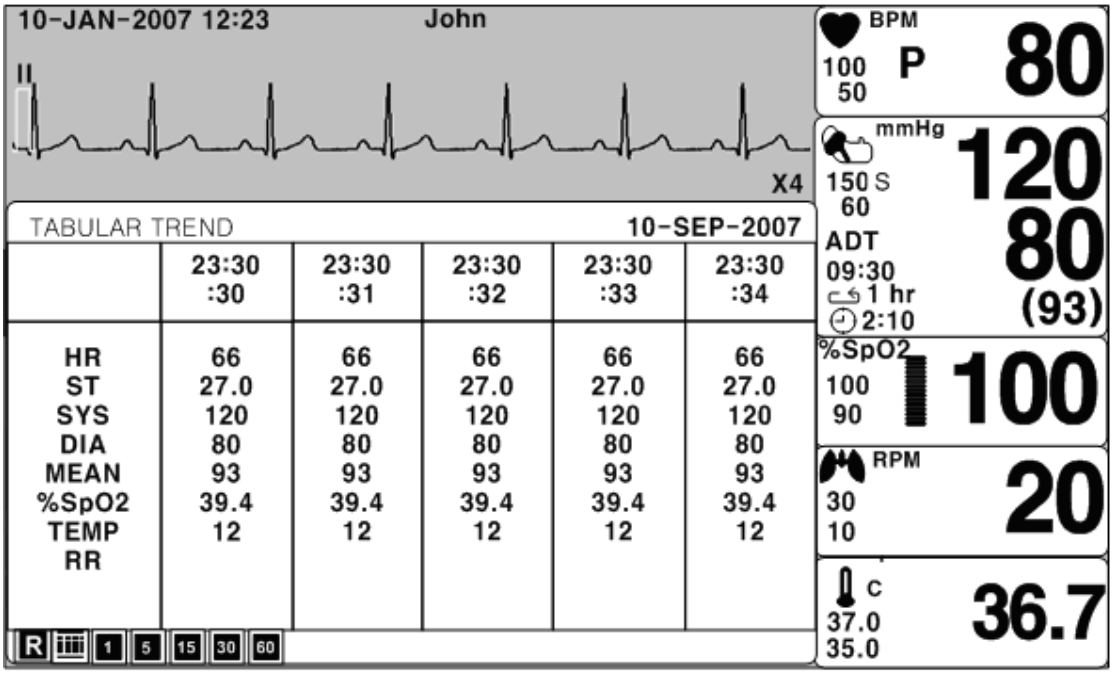
One can set up and store data and time that one can see in a screen.



TABULAR TREND

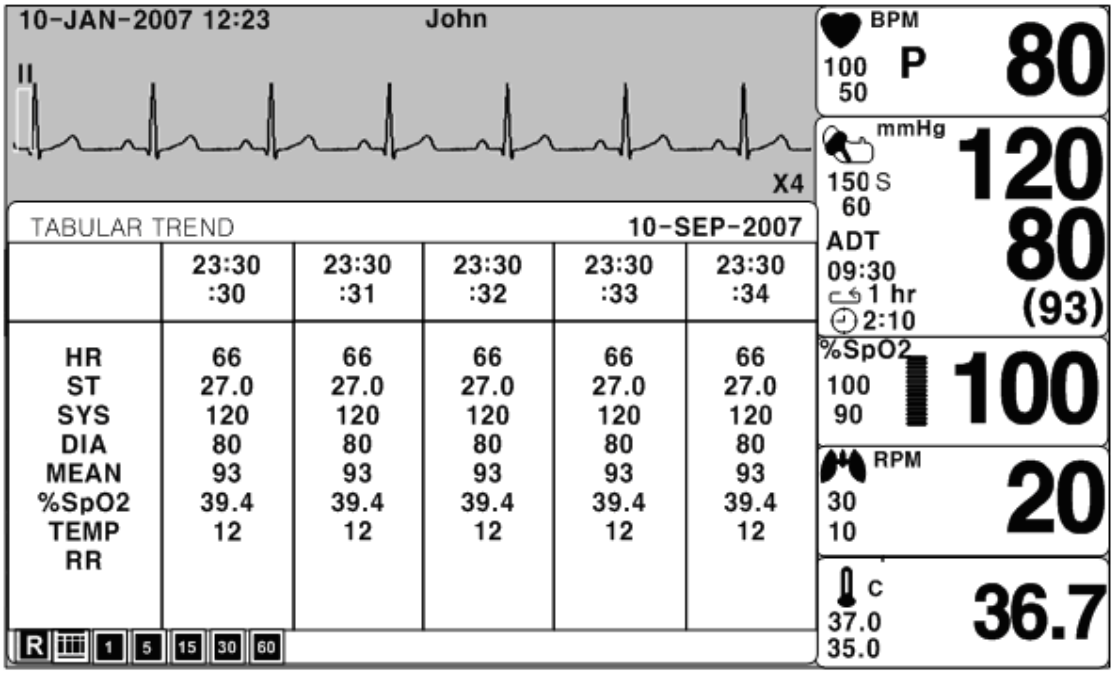
One can see the stored data at the time previously set up.

MAIN MENU	GRAPHIC TREND	TABULAR TREND	TREND WINDOW SETUP
PREV MENU			



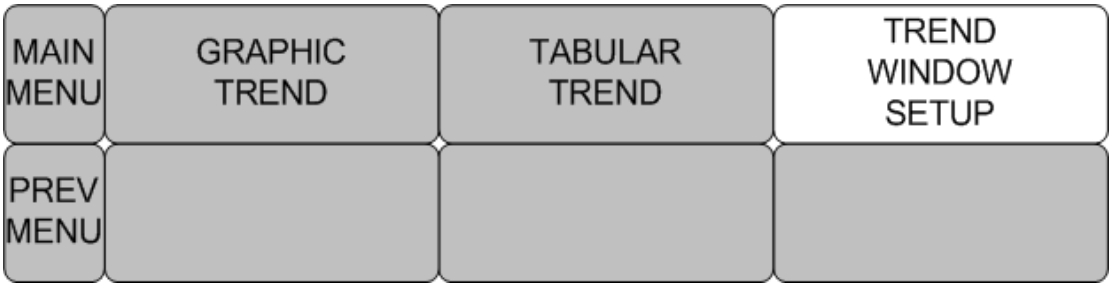
TIME INTERVAL

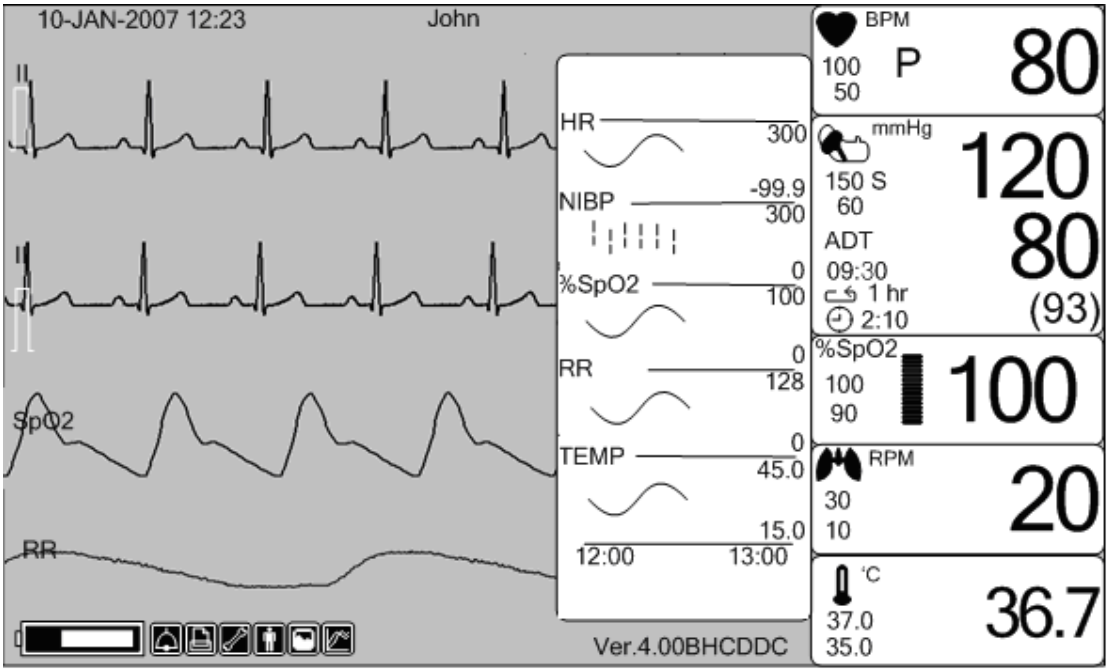
One can store data and set up time.



TREND WINDOW SETUP

Set the trend display window that will show the real time wave window.





TIME PERIOD

Set visible time period in a screen.

MAIN MENU	TIME PERIOD: 30MINS	SET TREND PARA	
PREV MENU			

MAIN MENU	TIME PERIOD:	> 30MINS 60MINS 90MINS 3HRS 6HRS 12HRS
PREV MENU		

SET TREND PARA

Set parameter for display in a screen.

MAIN MENU	TIME PERIOD: 30MINS	SET TREND PARA	
PREV MENU			

SET TREND PARA			
RETURN	ON/OFF		
HR	ON		
ST	ON		
%SPO2	ON		
PR	OFF		
RR	OFF		
NIBP	OFF		
TEMP	OFF		

TREND PRINT

Graphic: select the number which selects a graphic trend and press print to print the selected trend.

Table: select the table number to be print and press print to receive printout of all the data in the selected patient admit (Admit) table.

5. ECG

5.1 Outline

Color and Name for Each Cable Size

ECG Connector Location and Measurement Cable

5 Lead Electrode Attached Location

3 Lead Electrode Attached Location

Method to Attach Electrode to Baby

5.2 ECG Data Window

5.3 ECG Data Setup

TRACE 1 LEAD SELECT

ALARM LIMIT

ALARM

QRS VOLUME

ECG SIZE

HEART RATE SOURCE

ECG SPEED

ANALYSIS SETTING

5.1 Introduction

It calculates the heart rate with 3 or 5 leads ECG signal acquisition and perform the alarm according to the setting value.

Colors and Standards of Cables

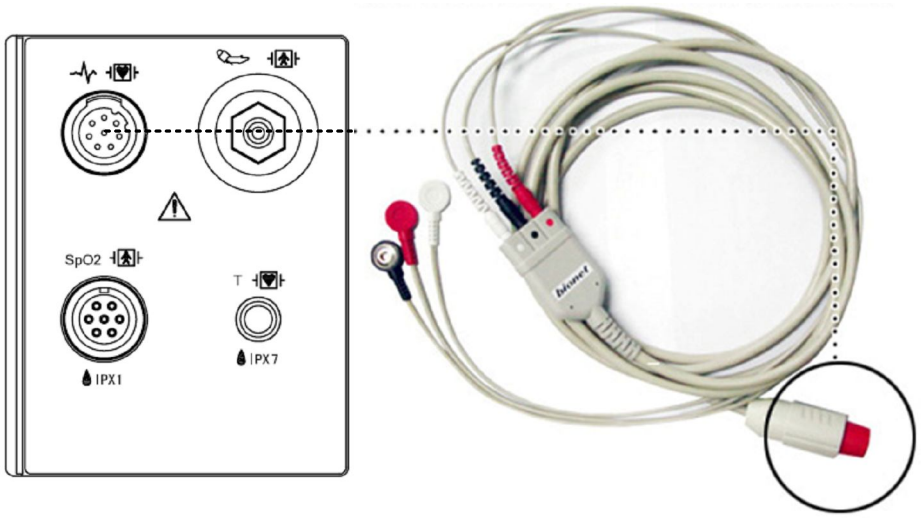
Leadwire	AHA Color code	AHA Label	IEC Color code	IEC Label
Right arm	White	RA	Red	R
Left arm	Black	LA	Yellow	L
Right leg	Green	RL	Black	N
Left leg	Red	LL	Green	F
V1(precordial)	Brown	V1	White	C1

AHA：American Heart Association (U.S.A. standard)

IEC：International Electro technical Commission (Europe standard)

Position of ECG Connector and Measuring Cable

ECG connecter +detect cable



Attaching Electrodes to the Patient

1. Shave excess hair. With a piece of cotton pad moistened with alcohol, clean the patient's skin where the electrodes should be mounted. Avoid wrinkled or uneven skin areas. Wipe off the alcohol with a dry cotton pad.

2. Open the electrode package and take out the electrode.

3. Remove the backing paper from the electrode. Be careful not to touch the adhesive side.

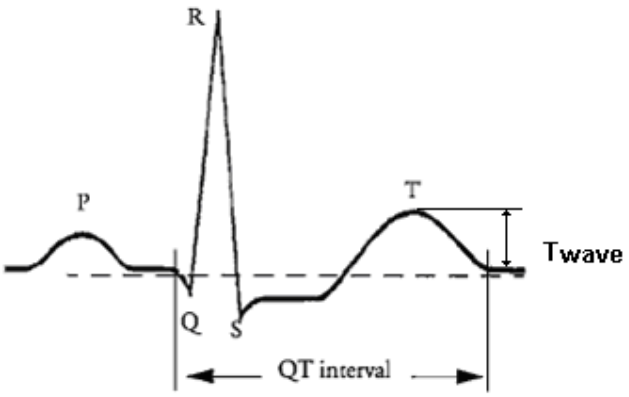
4. Attach the disposable electrode to the previously cleaned skin. Avoid wrinkled and uneven skin areas.

5. Attach the electrode lead which is connected to the monitor onto the electrode.

6. Fasten the electrode lead to the skin with surgical tape with an extra length of wire between the tape and the electrode. This prevents body movement from moving the electrode lead.

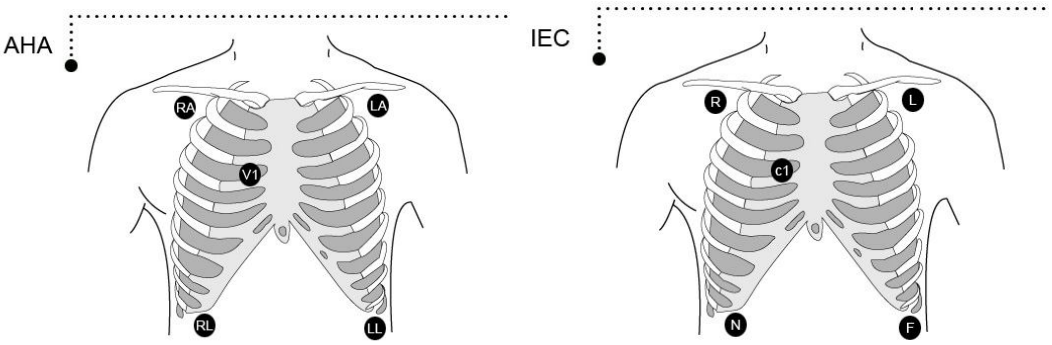
Note
✓ To maintain good contact between the electrode and skin, check that the paste of the disposable electrode is not dry.
✓ When contact of the disposable electrode becomes poor, replace the electrode with a new one immediately. Otherwise, contact impedance between the skin and electrode increase and the correct ECG cannot be obtained.
✓ If the contact is bad before the expiration date on the package, replace the electrode with a new one.
✓ To obtain a stable ECG waveform rub the skin with "skin Pure" skin preparation gel or tincture of Benzoin.
✓ Shall use only the CE certified disposable electrode.

Information on the ECG waveform

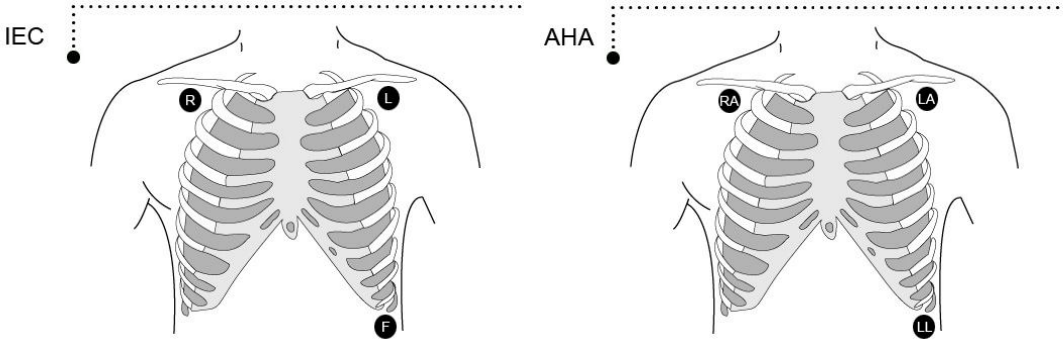


When ECG signal is 80bpm T-wave duration is 180ms, and the QT interval is 350ms.

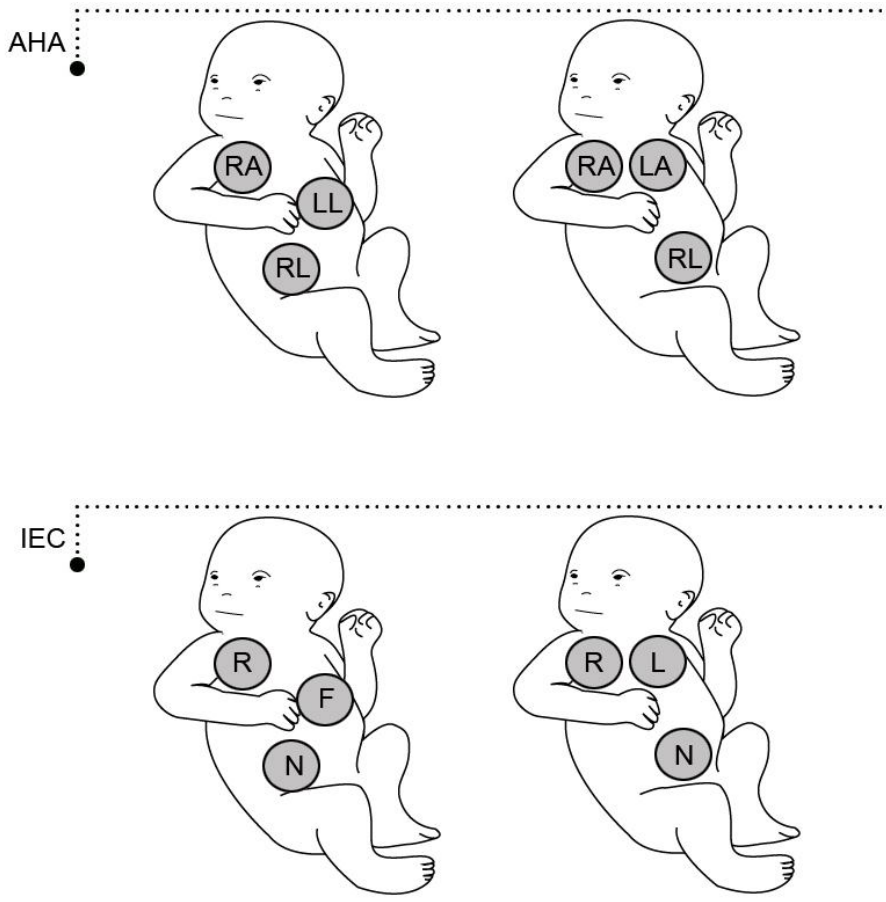
5 Position of 5-Lead



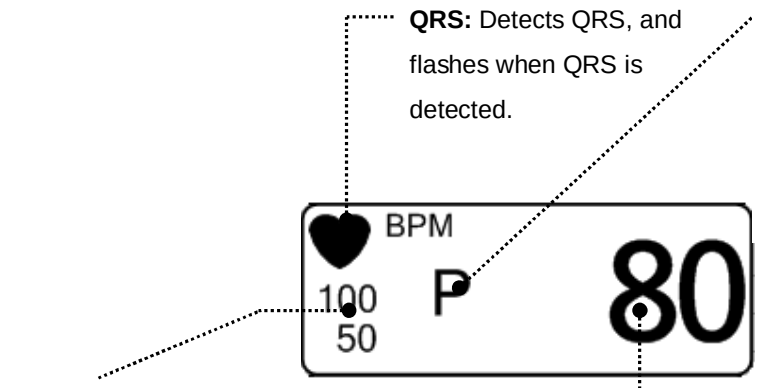
Position of 3-Lead Wrier Electrode



How to Attach the NEONATE Electrode



5.2 ECG Data Window



QRS: Detects QRS, and flashes when QRS is detected.

Pace Detector Indicators: Detects and displays the patient's pace maker and flashes.

Heart Rate Alarm Limit: Displays the QRS limits, and gives an alarm if a value is over the limits.

Heart Rate: Displays heart rate per minute.

Note
ECG Wave Display is always on when the cable is connected.

The heart rate is calculated by a moving average. The monitor detects 8 consecutive beats, averages the R-R intervals of the latest 8 beats and uses this average to calculate the current heart rate. When a new beat is detected, the heart rate is recalculated using the latest 8beats. The heart rate display is updated every 3 seconds.

Heart rate meter updates a new heart rate for a step increase or decrease in 10 seconds maximum. When ventricular tachycardia is detected, the alarm set in 5 seconds maximum.

Check that the delay time of the output signal (alarm trigger 80ms maximum) is within the range of the connected equipment.

Safety Precautions

Warning
CABLES — Route all cables away from patient's throat to avoid possible strangulation. **CONDUCTIVE CONNECTIONS** — Extreme care must be exercised when applying medical electrical equipment. Many parts of the human/machine circuit are conductive, such as the patient, connectors, electrodes, transducers. It is very important that these conductive parts do not come into contact with other grounded, conductive parts when connected to the isolated patient input of the device. Such contact would bridge the patient's isolation and cancel the protection provided by the isolated input. In particular, there must be no contact of the neutral electrode and ground. **DEFIBRILLATION** — Do not come into contact with patients during defibrillation. Otherwise serious injury or death could result. To avoid the risk of serious electrical burn, shock, or other injury during defibrillation, all persons must keep clear of the bed and must not touch the patient or any equipment connected to the patient. After defibrillation, the screen display recovers within 10 seconds if the correct electrodes are used and applied in accordance with the manufacturer's instructions. ECG cables can be damaged when connected to a patient during defibrillation. Check cables for functionality before using them again. The peak of the synchronized defibrillator discharge should be delivered within 60ms of the peak of the R wave. The signal at the ECG output on the patient monitors is delayed by a maximum of 30ms. If the ECG waveform on the screen is too unstable to synchronize with the patient's heart beat because of the following reason, remove the cause of an alarm, message, or unstable ECG, and then use a stable ECG lead for synchronization. ✓ ECG electrode is detached or broken. Lead wire is detached or broken. ✓ Lead wire moves. AC interference, EMG noise or noise from ESU is superimposed. ✓ Connection cable is broken or has a short circuit. Connector has poor contact.

INTERFACING OTHER EQUIPMENT — Devices may only be interconnected with each other or to parts of the system when it has been determined by qualified biomedical engineering personnel that there is no danger to the patient, the operator, or the environment as a result. In those instances where there is any element of doubt concerning the safety of connected devices, the user must contact the manufacturers concerned (or other informed experts) for proper use. In all cases, safe and proper operation should be verified with the applicable Manufacturer's instructions for use, and system standards IEC 60601-1-1/EN 60601-1-1 must be complied with.

Electrosurgery Unit

- ✓ Electrosurgical units(ESU) emit a lot of RF interference. If the monitor is used with an ESU,RF interference may affect the monitor operation.
- ✓ Locate the monitor as far as possible from the ESU. Locate them on opposite sides of the operating table, if possible.
- ✓ Connect the monitor and ESU to different AC outlets located as far as possible from each other.
- ✓ When using this monitor with an electrosurgical unit, its return plate and the electrodes for monitoring must be firmly attached to the patient. If the return plate is not attached correctly,it may burn the patient's skin where the electrodes are attached.

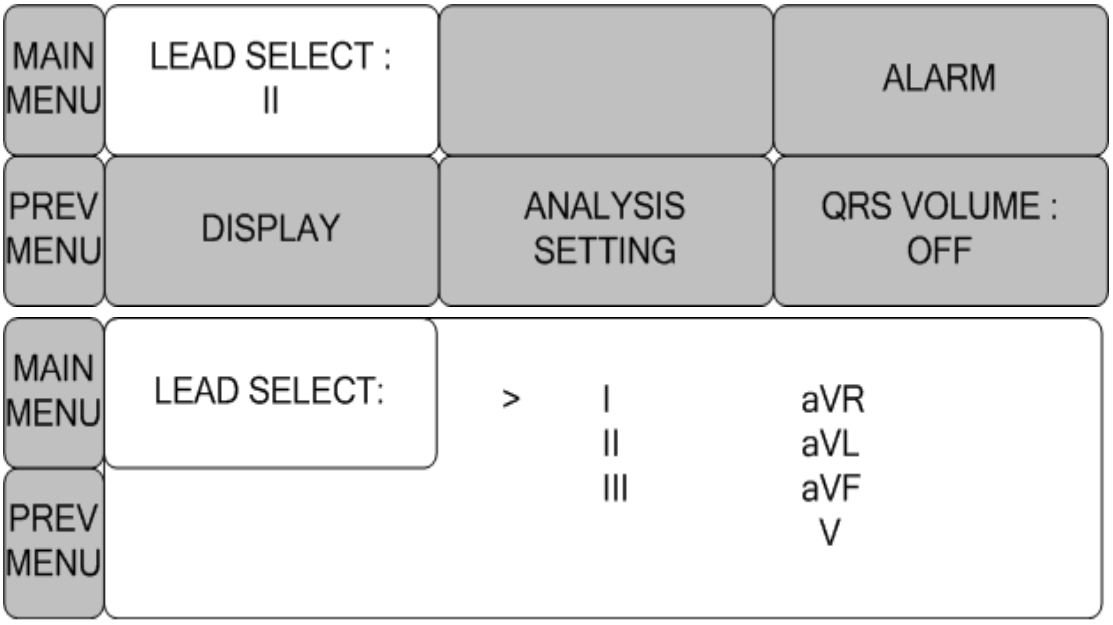
5.3 ECG Data Setup

A setup window appears at lower part of the screen when the Trim Knob Key is pressed in the ECG Parameter Window.

Selection is made by pressing the Trim Knob Key, while movement across the menu is performed by turning the key either clock or anticlockwise.

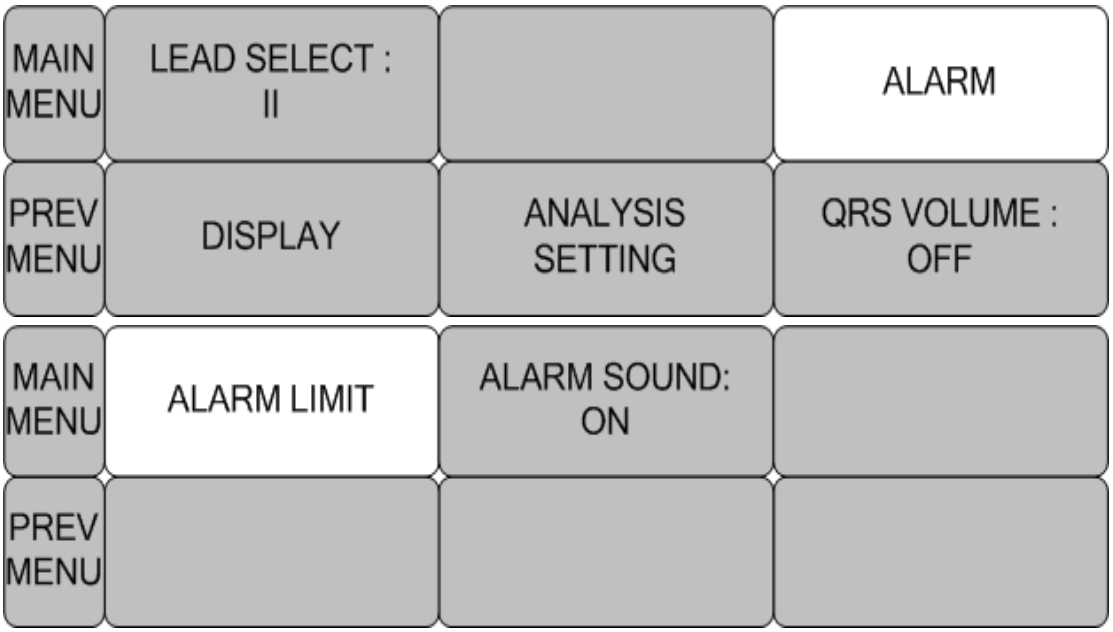
TRACE 1 LEAD SELECT

Select channels from I to V in ECG



ALARM LIMIT

Alarm Limit is 0 ~ 300.



ECG ALARM LIMIT

RETURN	UNITS	LOW	HIGH
HR	bpm	60	120

ALARM SOUND

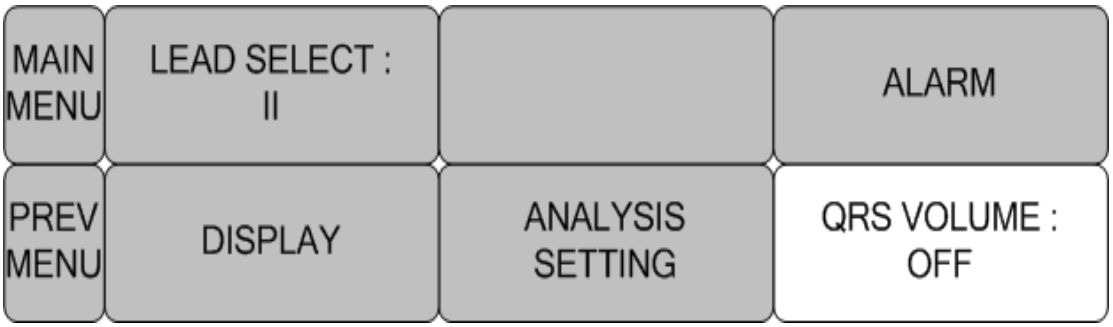
Set ON/OFF of ECG alarm sound.

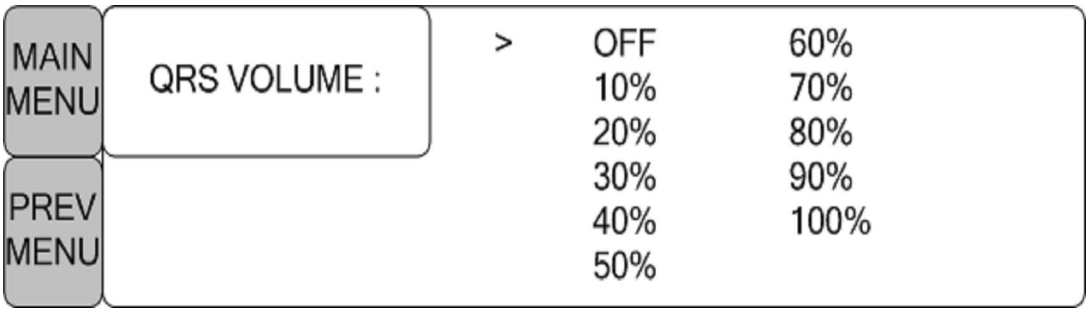
MAIN MENU	LEAD SELECT : II		ALARM
PREV MENU	DISPLAY	ANALYSIS SETTING	QRS VOLUME : OFF
MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

ECG ALARM SOUND	
> RETURN	ECG ALARM SOUND
HR	ON

QRS VOLUME

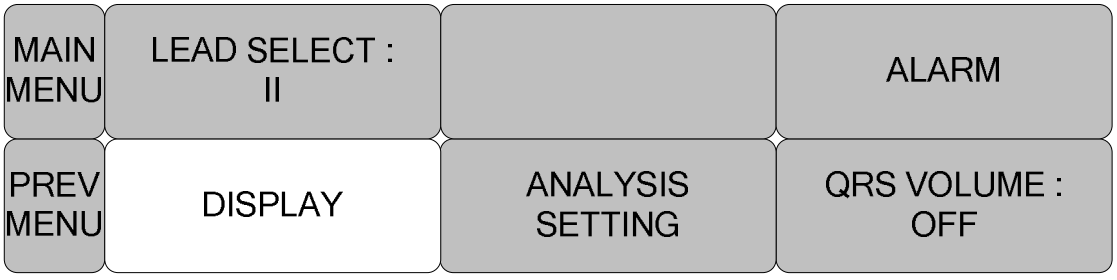
Move the Key to select a volume rate from OFF, 10% to 100%.





DISPLAY

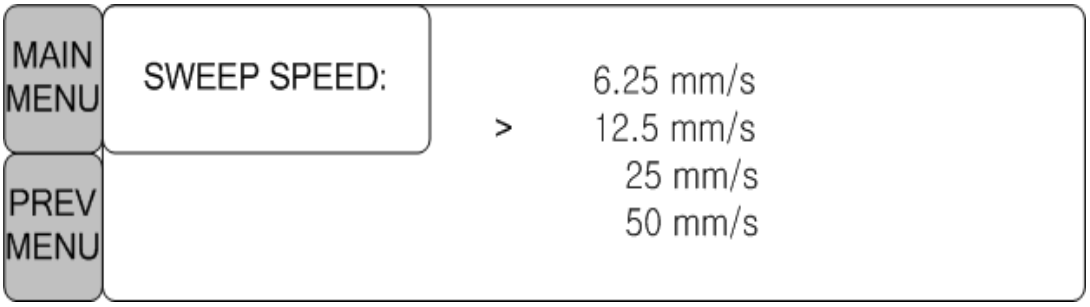
Set the sweep speed and waveform size.



ECG SPEED

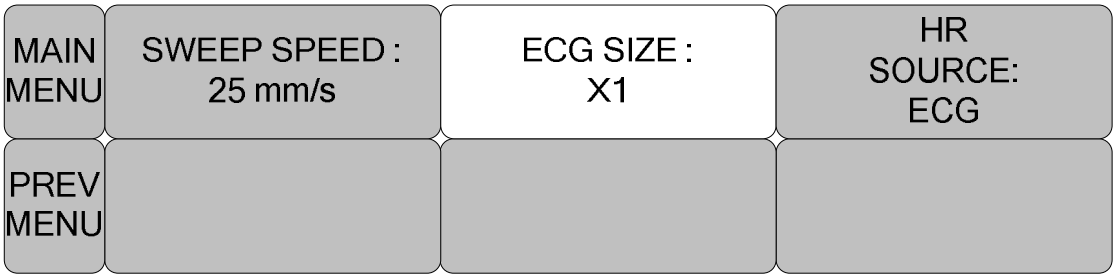
ECG speed is 25 mm/s.

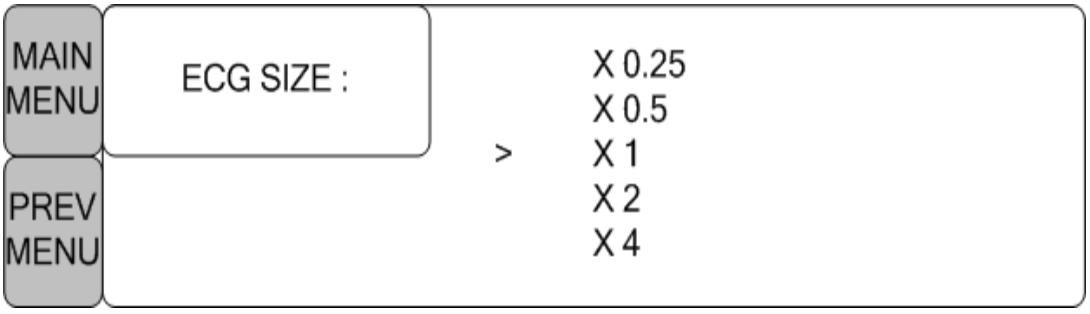
Speed is changeable to 6.25, 12.5, 25, 50mm/s.



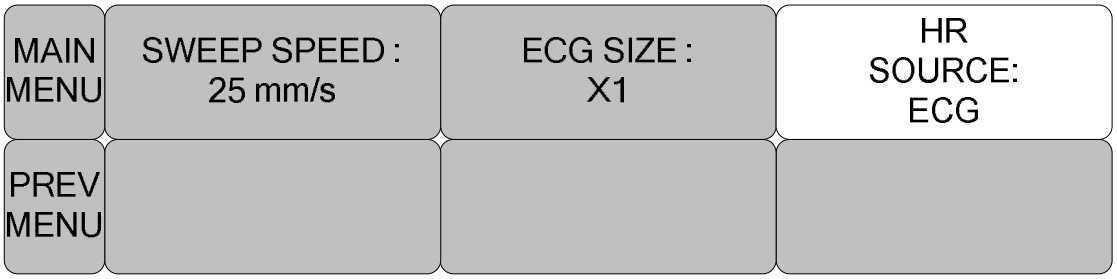
ECG SIZE

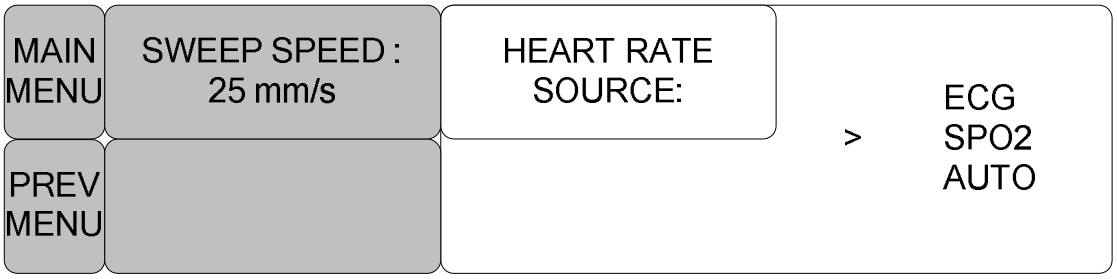
The size is changeable to X 0.25, X0.5, X1, X2, X4.





HR SOURCE





ANALYSIS SETTING

Analysis setting divided to 3 menus.

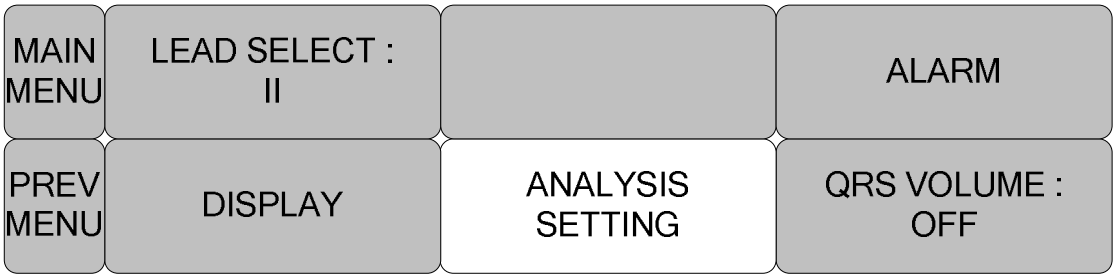
ECG FILTER：One may select from three frequency types for WAVE FILTER.

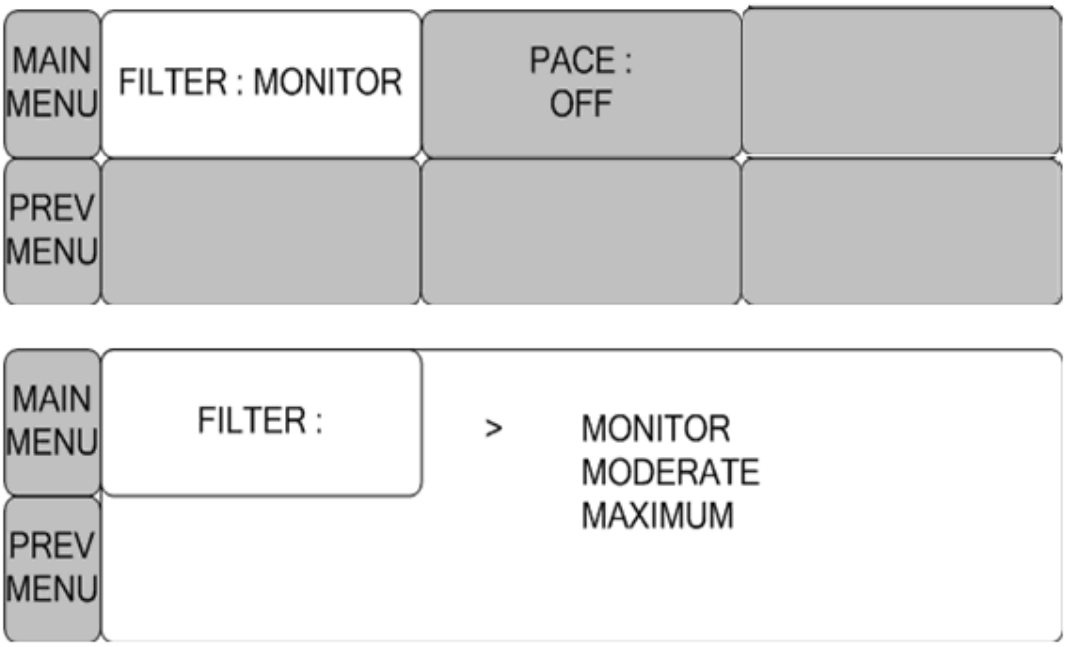
MONITOR 0.5Hz ~ 40Hz

MODERATE 0.5Hz ~ 25Hz

MAXIMUM 5Hz ~ 25Hz

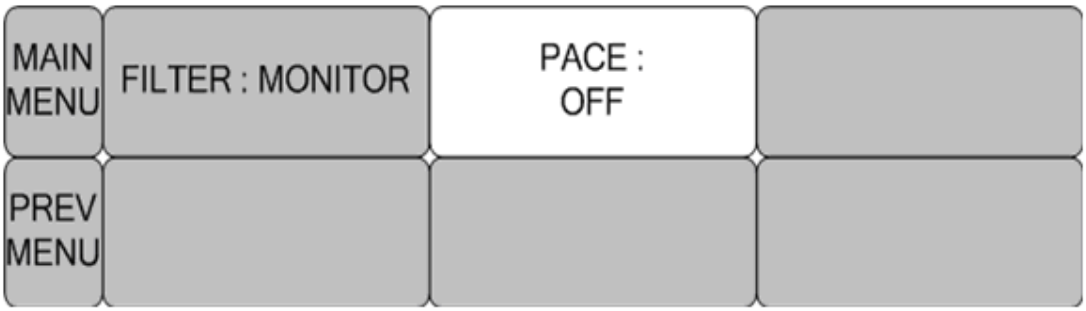
DIAGONOSIS is





PACE：Sets up ON/OFF to indicate that the patient has PACE.

The PACE menu option enables/disables the pacemaker detection program.



Be aware of the following when monitoring a patient with a pacemaker.

Warning
FALSE CALLS—False low heart rate indicators or false asystole calls may result with certain pacemakers because of electrical overshoots. MONITORING PACEMAKER PATIENTS—Monitoring of pacemaker patients can only occur with the pace program activated.

PACEMAKER SPIKE—An artificial pacemaker spike is displayed in place of the actual pacemaker spike. All pacemaker spikes appear uniform. Do not diagnostically interpret pacemaker spike size and shape.

PATIENT HAZARD—A pacemaker pulse can be counted as a QRS during asystole in either pace mode. Keep pacemaker patients under close observation.

PACEMAKER PATIENTS. Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest. Do not rely entirely upon rate meter ALARMS. Keep pacemaker patients under close surveillance.

CAUTION

FDA POSTMARKET SAFETY ALERT

The United States FDA Center for Device and Radiological Health issued a safety bulletin October 14, 1998. this bulletin states "that minute ventilation rate-adaptive implantable pacemakers can occasionally interact with certain cardiac monitoring and diagnostic programmed rate."

The FDA further recommends precautions to take into consideration for patients with these types of pacemakers. These
precautions include disabling the rate responsive mode and enabling an alternate pace mode. For more information contact:

Office of Surveillance and Biometrics, CDRH, FDA
1350 Packard Drive, Mail Stop HFZ-510 Rockville, MD 20850 U.S.A

NOTE

ECG monitoring with patients in non-invasive trans coetaneous pacemakers may not be possible due to large amounts of energy produced by these devices. Monitoring ECG with an external device may be needed.

Trouble shooting

Problem :

Inaccurate heart rate and/or false asystole.

Solution :

Check ECG signal from patient:

1. Check/adjust lead placement.
2. Check/perform skin preparation.
3. Check/replace electrodes.

Check amplitude of ECG waveform:

1. Select ECG parameter label.
2. Select DISPLAY LEAD,
3. Scroll through all ECG leads and check for 0.5mV amplitude at normal (1X) size. (at least 0.5mV amplitude is required for QRS detection.) for borderline signals, validate on a graph.
4. If amplitudes are low, electrodes may need to be repositioned or replaced.

Problem :

False ventricular calls.

Solution :

Check ECG signal from patient: (the chest lead may exhibit polarity changes which may occasionally cause an inaccurate call.)

1. Check/adjust lead placement.
2. Check/perform skin preparation.
3. Check/replace electrodes. (if chest lead is a problem, move the chest lead to another chest position or leg position.)

Problem :

Inaccurate pacemaker detection

Solution :

Use pacemaker processing:

1. Select ECG parameter label.
2. Display the lead of ECG with the greatest amplitude in the top waveform position.
3. Select ANALYSIS SETTINGS.
4. SELECT DETECT PACE.

6. SpO_2

6.1 Outline

SpO_2 Connector Location and Measuring Cable

6.2 SpO2 Data Window

6.3 SpO2 Data Setup

SWEEP SPEED

RATE VOLUME

ALARM

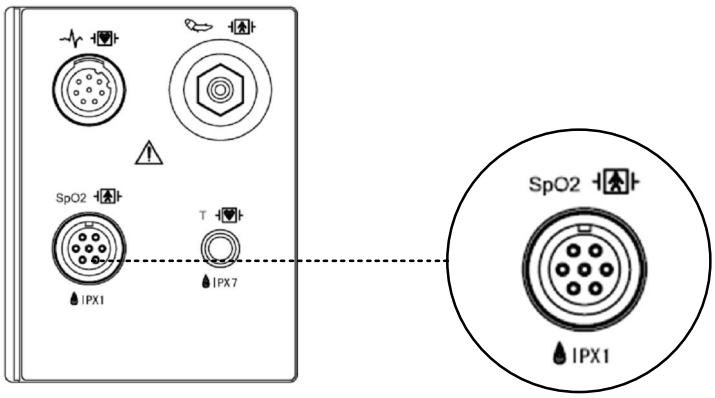
ALARM LIMIT

6.1 Outline

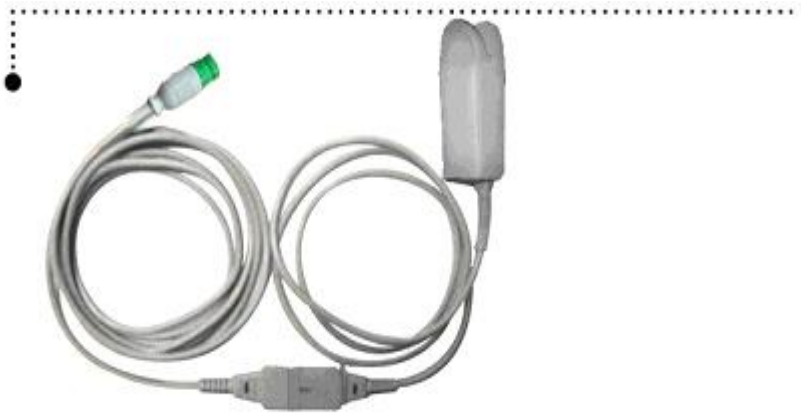
SPO2 monitoring is a noninvasive technique used to measure the amount of oxygenated hemoglobin and pulse rate by measuring the absorption of selected wavelengths of light. The light generated in the probe passes through the tissue and is converted into an electrical signal by the photodetector in the probe. The monitor processes the electrical signal and displays on the screen a waveform and digital values for SpO2 and pulse rate. It detects SpO2 in the way of transmitting the red and infrared rays into the capillary vessel to take the pulsation. Also perform the alarm function according to the setting value.

SpO2 Connector Location and Measuring Cable

SpO_2 connector

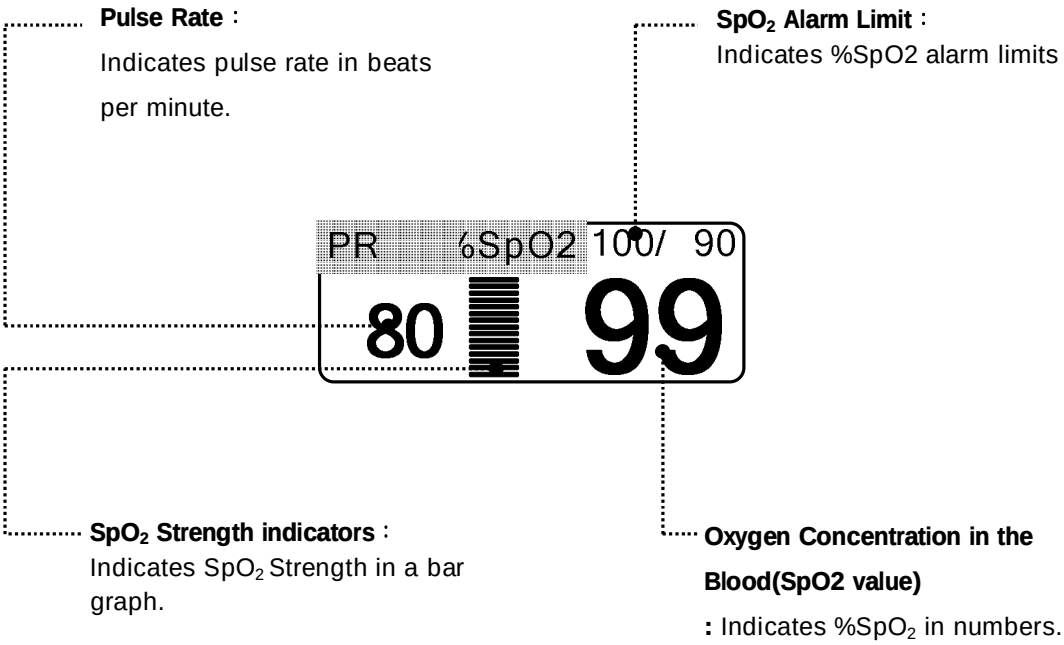


SpO_2 Measuring Cable



Note
The signal input is a high-insulation port and it is defibrillator proof ( )   The insulated input ensures patient safety and protects the device during defibrillation and electrosurgery.

6.2 SpO_2 Data Window



The current SPO2 value and the derived pulse rate (RATE) are displayed. The block sets indicate the strength of the signal (twenty block bars indicate the strongest signal). The SPO2 measurements are averaged over a 6-second period of time.

The monitor display is updated every second.

The SPO2 monitoring features are found in the SPO2 menu. These features include alarm limit adjustment, display of RATE, and RATE volume.

Note
SpO_2 WAVE SIZE is changed automatically.

Signal and Data Validity

It is extremely important to determine that the probe is attached to the patient correctly and the data is verifiable. To make this determination, three indications from the monitor are of assistance—signal strength bar, quality of the SPO2 waveform, and the stability of the SPO2 values. It is critical to observe all three indications simultaneously when ascertaining signal and data validity.

Signal Strength Bar

The signal strength bar is displayed within the SPO2 values window. This bar consists of a 20 block set depending on the strength of the signal. Proper environmental conditions and probe attachment will help to ensure a strong signal.

Quality of SPO2 Waveform

Under normal conditions, the SPO2 waveform corresponds to (but is not proportional to) the arterial pressure waveform. The typical SPO2 waveform indicates not only a good waveform, but helps the user find a probe placement with the least noise spikes present. The figure below represents an SPO2 waveform of good quality.

Good Quality SPO2 Waveform

If noise (artifact) is seen on the waveform because of poor probe placement, the photodetector may not be flush with the tissue. Check that the probe is secured and the tissue sample is not too thick. Pulse rate is determined from the SPO2 waveform which can be disrupted by a cough or other hemodynamic pressure disturbances. Motion at the probe site is indicated by noise spikes in the normal waveform. (See the figure below.) It has been noted that letting the patient view the SPO2 waveform enables them to assist in reducing motion artifact.

SPO2 Waveform with Artifact

Stability of SPO2 Values

The stability of the displayed SPO2 values can also be used as an indication of signal validity. Although stability is a relative term, with a small amount of practice one can get a good feeling for changes that are artifactual or physiological and the speed of each. Messages are provided in the SPO2 values window to aid you in successful SPO2 monitoring.

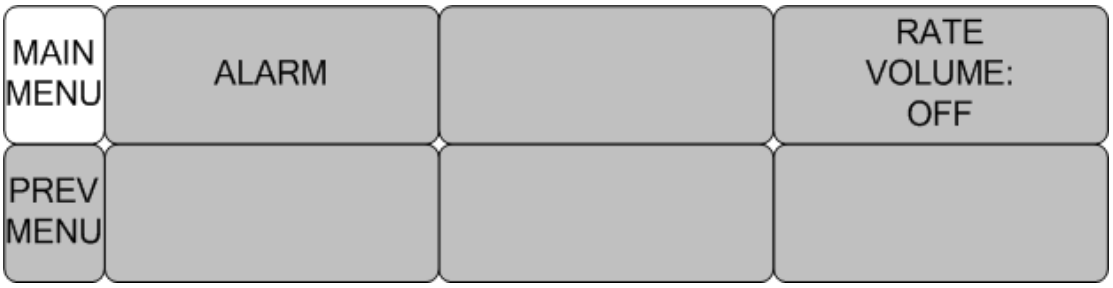
WARNING
In the monitoring of patients the coincidence of adverse conditions may lead to a disturbed signal going unnoticed. In this situation artifacts are capable of simulating a plausible parameter reading, so that the monitor fails to sound an alarm. In order to ensure reliable patient monitoring, the proper application of the probe and the signal quality must be checked at regular intervals.

6.3 SpO_2 Data Setup

ALARM LIMIT： Menu in which SpO_2 limits are set up.

SWEEP SPEED: speed SpO2 Waveform display setting menu

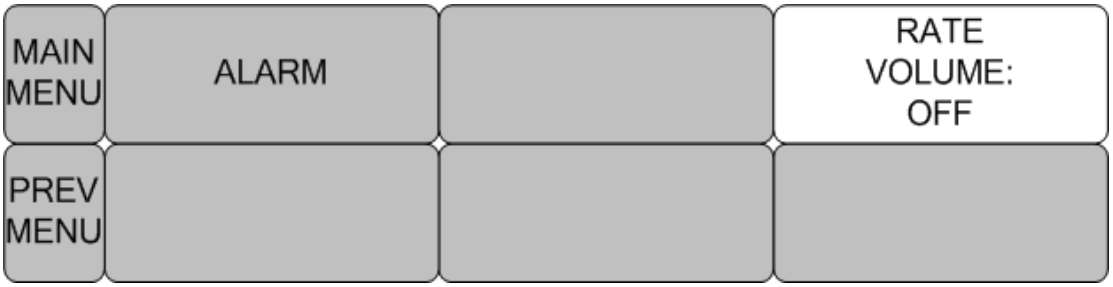
RATE VOLUME：Menu in which RATE VOLUME is set up

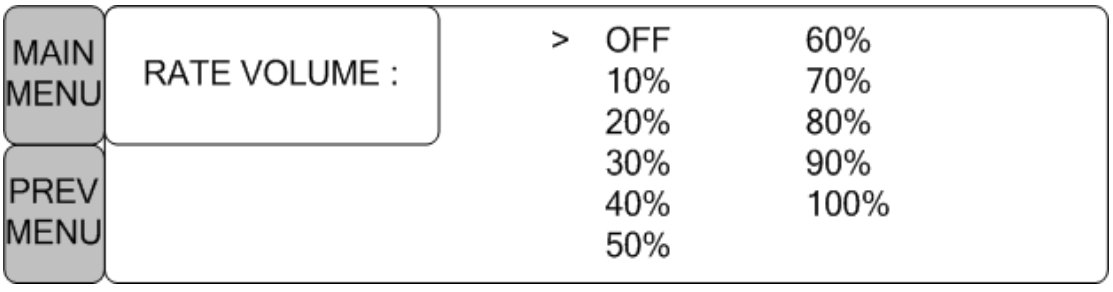


RATE VOLUME

Move the KEY to select the volume from OFF to 100%.

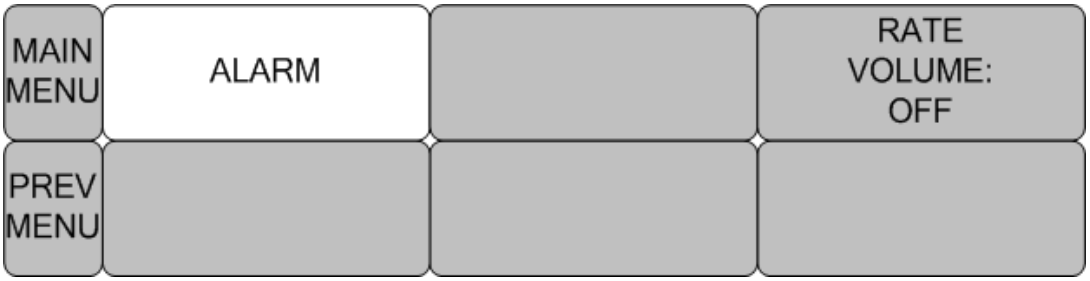
When the ECG volume rate is set, it turns OFF automatically.





ALARM

Two menus: ALARM LIMIT, ALARM provided in the alarm menu



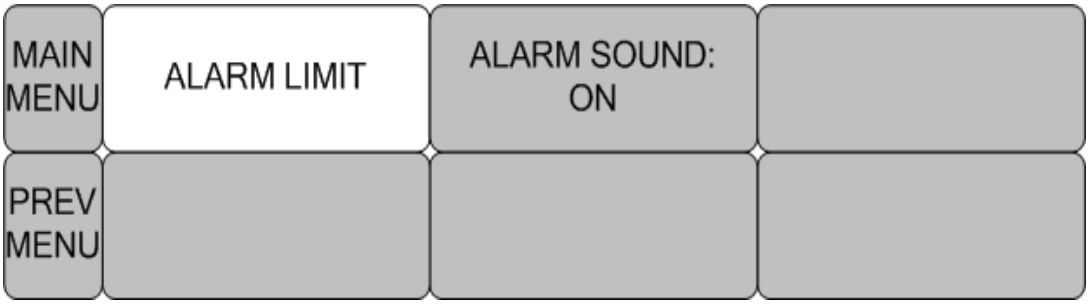
ALARM LIMIT

Number setting of alarm value of %SpO_2 is 0 ~ 100

1. Move the ▸ mark to select from RETURN, SpO_2 or SpO_2-R, and press.
2. After pressing at SpO_2, move the cursor right or left to LOW, and press.
3. Once the color is changed, move the cursor again to the selected value and press.
4. Place the cursor to HIGH and press, when the color changes, move the cursor again to select the targeted value, and press. Finally move to SpO_2 and press.

(You may decide to perform the process in the opposite order, LOW to HIGH, to have the same result.)

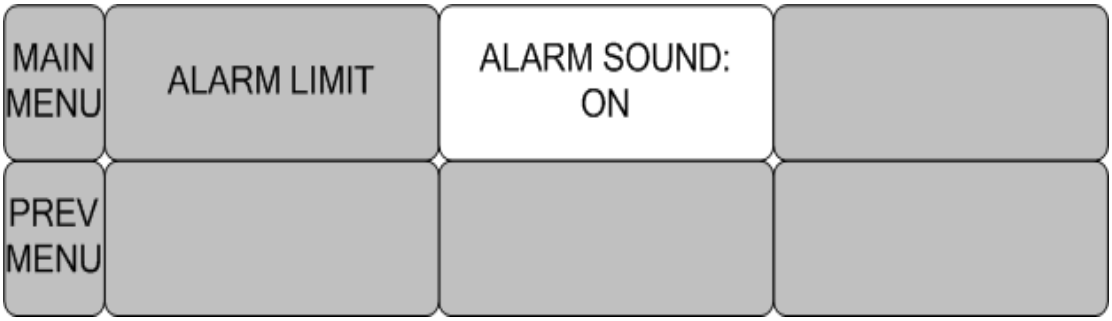
5. After pressing at SpO_2-R, move the cursor right or left to LOW, and press.
6. Once the color is changed, move the cursor again to the selected value and press.
7. Place the cursor to HIGH and press, when the color changes, move the cursor again to select the targeted value, and press. Finally move to SpO_2-R and press.
8. With the selection of RETURN the user gets out of the menu.

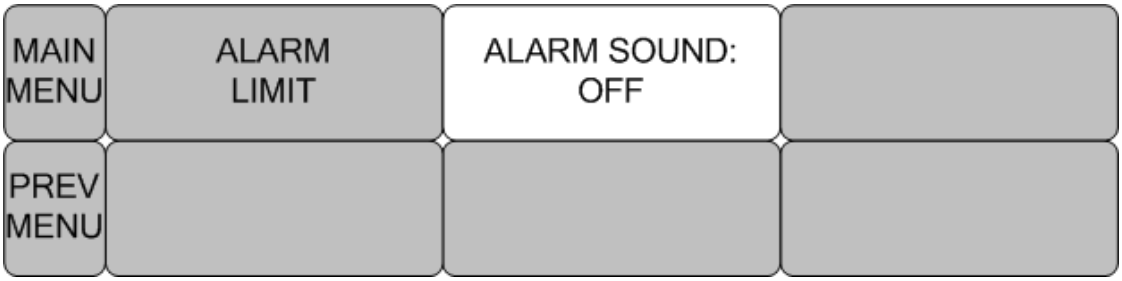


SPO2 ALARM LIMIT			
RETURN	UNITS	LOW	HIGH
SPO2-%	%	90	100
SPO2-R	BPM	50	150

ALARM SOUND

Warning sound or message displays configuration menu when an alarm is triggered.





LEAD FAULT Condition

When using a reusable finger probe, there is a system alarm to alert you when the probe is off the Monitor. The monitor defaults this " LEAD FAULT" condition as a System Warning alarm, however, you can set it as a System ALARM LEVEL in Monitor Defaults.

SPO2 Messages

Below is a list of system status alarm messages which may be displayed in the SPO2 parameter window during monitoring.

CHECK PROBE

Reusable finger probe is off the patient. Check the probe. *The factory default for this alarm is MESSAGE ALARM.*

PULSE SEARCH

Detection by the monitor of a repeatable pulse has ceased. Check the patient and the probe site.

POOR SIGNAL

The SPO2 signal is too low. No SPO2 data is displayed. This can be due to a low patient pulse, patient motion, or some other interference. Check the patient and the probe.

LOST SIGNAL

SPO2 data continues to be displayed, but the quality of the signal is questionable. Check the patient and the probe.

WARNING
• Federal Laws of the United States restrict the use and sale of this device by, or on the order of a physician. • Do not use this device in the presence of flammable anesthetics. • Do not use this device in the presence of magnetic resonance imaging (MR or MRI) equipments. • This device must be used in conjunction with clinical signs and symptoms. This device is only intended to be an adjunct in patient assessment. • Operation of this device may be adversely affected in the presence of strong electromagnetic sources, such as electro-surgery equipments. • Operation of this device may be adversely affected in the presence of computed tomography (CT) equipments. • Misuse or improper handling of the device could result in damage to the device. This may cause inaccurate readings.

CAUTIONS
• Do not autoclave, ethylene oxide sterilize, or immerse the device in liquid. • This device is intended for use by persons trained in professional health care who have a complete understanding of pulse Oximetry. The operator must be thoroughly familiar with the information in this manual before using the device. • %SpO2 measurements may be adversely affected in the presence of high ambient light. Avoid exposure to high ambient light. • Dyes introduced into the bloodstream, such as methylene blue, indocyanine green, indigo carmine, fluorescein, and patent blue V may adversely affect the accuracy of the %SpO2 reading. • Any condition that restricts blood flow, such as use of blood pressure cuff, extremes in systemic vascular resistance, or reduction of peripheral circulation caused by hypothermia, may cause an inability to determine accurate pulse rate and %SpO2 readings.

7. RESPIRATION

7.1 Outline

Respiration Connector and Measuring Cable

7.2 RESPIRATION Data Window

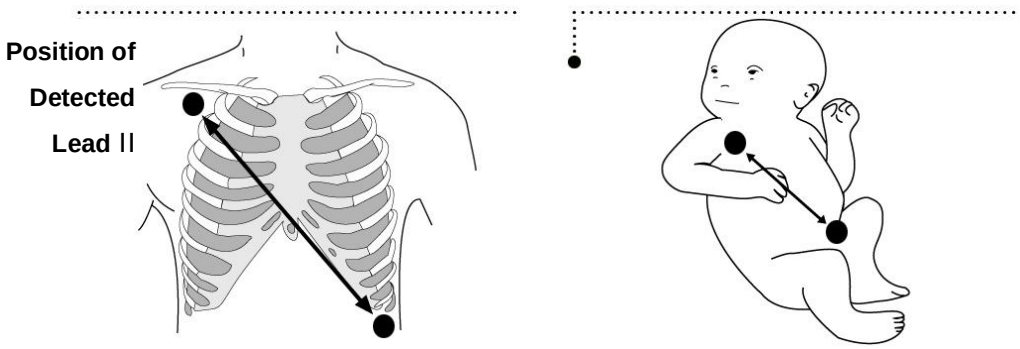
7.3 RESPIRATION Data Setup

Respiration Size

Alarm Limit

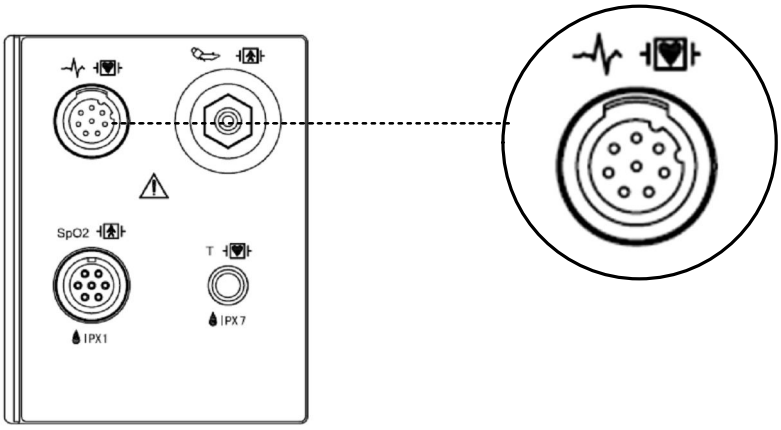
7.1 Outline

Respiration increases the skin area of the chest upon inhalation, causing changes in the resistance of skin. Through this it calculates respiration value per minutes and performs the alarm function according to limit value.



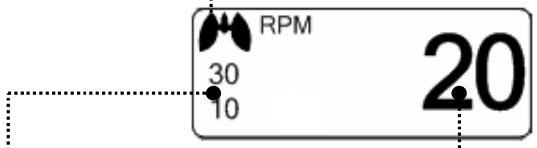
Respiration Connector and Measuring Cable

Respiration Connecter



Respiration Measuring Cable

7.2 Respiration Data Window



Breathe indicator:
Indicates the detected breath

Respiration alarm limit:
Indicates respiration limits.

Breathing Number: Displays the number of respiration per minute.

7.3 Respiration Data Setup

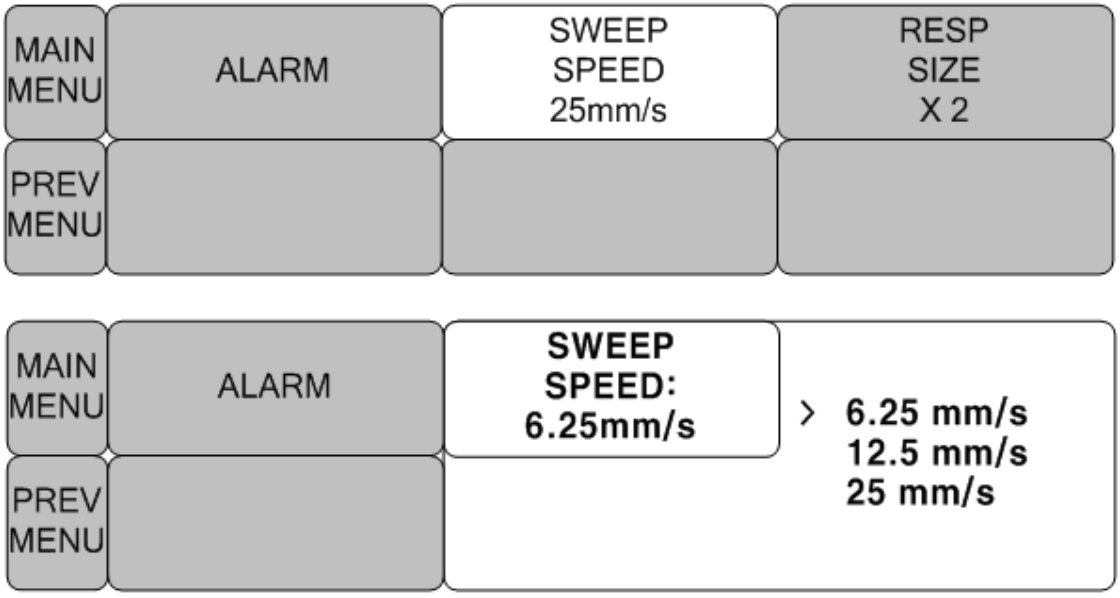
ALARM: Respiration alarm setting menu

RESP SIZE: A menu to setup Wave Display

SWEEP SPEED: A menu to setup Wave Display of speed

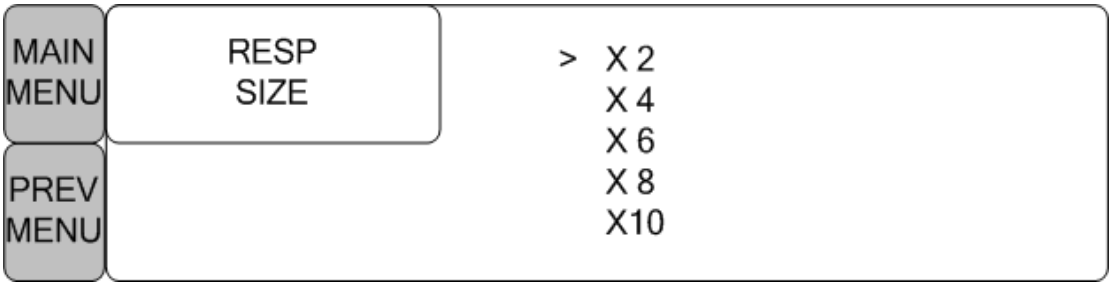
RESPIRATION SPEED

Wave pattern speed is 25 mm/s.



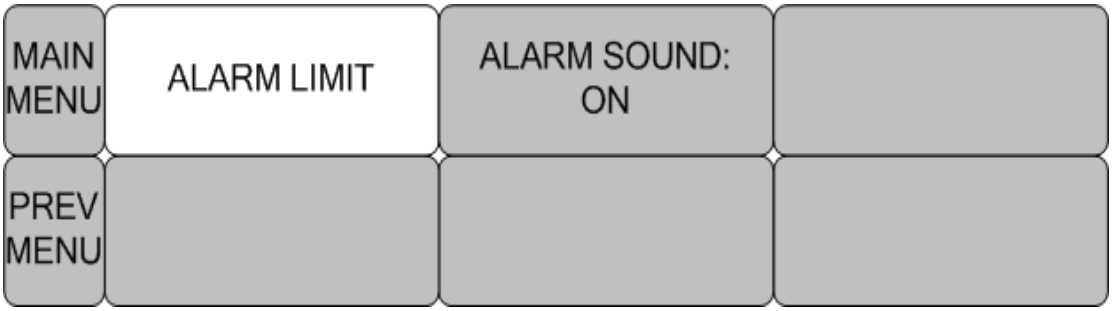
RESPIRATION

Set wave pattern size X2~ X10.



ALARM

Alarm menu provide ALARM LIMIT and ALARM.



ALARM LIMIT

Alarm Limit of Respiration Numeric Value is 5 ~ 150bpm

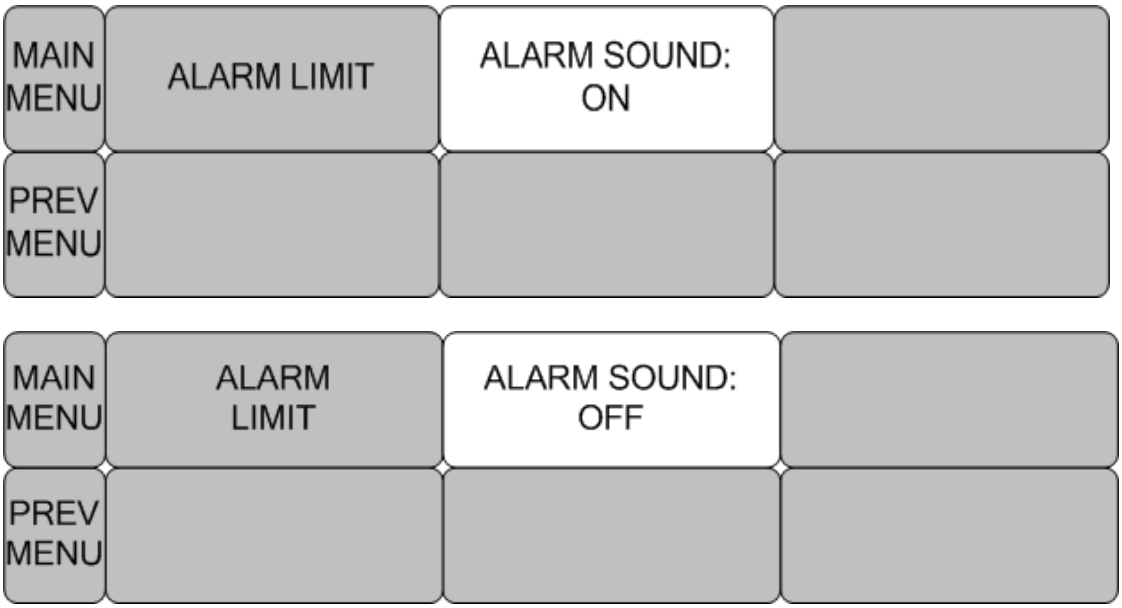
1. Move the ▸ mark to select RETURN, RESP and press.
2. After a press in RESP, move the cursor right or left to LOW, and press.
3. After the color changed, move the cursor right or left to the selected value, and press.
4. Place the cursor to HIGH, and press. When the color has changed, move the cursor again to select the value and press. Move to the RESP and press again. (You may decide to perform the process in the opposite order, LOW to HIGH, to have the same result.)
5. Select RETURN to get out of the window.

RESP ALARM LIMIT

RETURN	UNITS	LOW	HIGH
RESP	RPM	10	30

ALARM SOUND

Warning sound or message displays activation setting when Respiration ALARM occurs.



8. NIBP

8.1 Outline

NIBP Connector Location and Cuff

8.2 NIBP Data Window

8.3 NIBP Data Setup

ALARM LIMIT

ALARM

CUFF SIZE

UNIT SELECT

INTERVAL

STAT

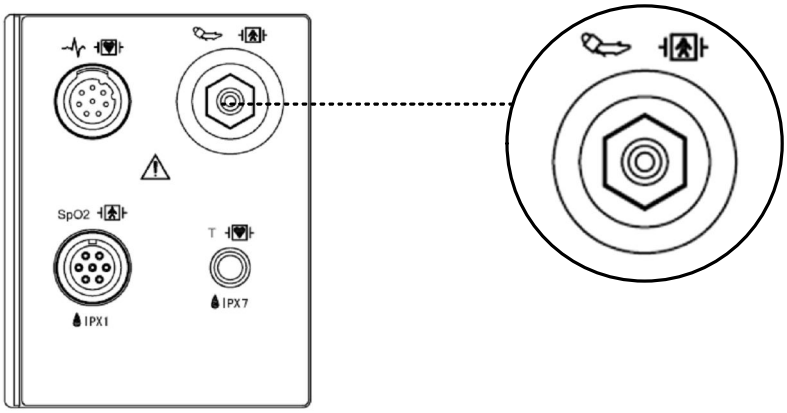
INFLATION

8.1 Outline

This function is to measure minimum, Maximum and average blood pressure by using Oscillometric method

Position of NIBP Connecter and cuff

NIBP Connector



Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in Parameter Menu before measurement.

WARNING
Noninvasive blood pressure monitoring is not recommended for patients with hypotension, hypertension, arrhythmias or extremely high or low heart rate. The software algorithm cannot accurately compute NIBP on patients with these conditions.

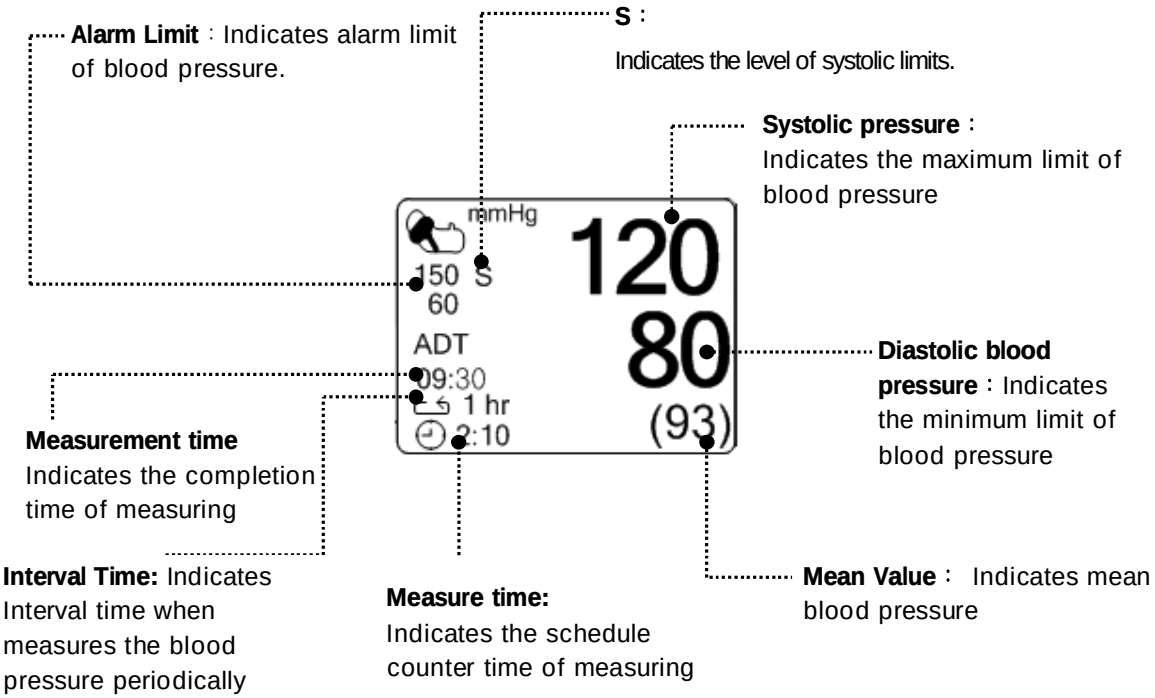
Note
As the value of NIBP can vary according to the age and sex of a patient, the user needs to set up right data in parameter Menu before measurement. Tubes between the cuff and the monitor must not be kinked or blocked. The air pad should be exactly over the branchial artery. Tubing is immediately to the right or left of the branchial artery to prevent kinking when elbow is bent.

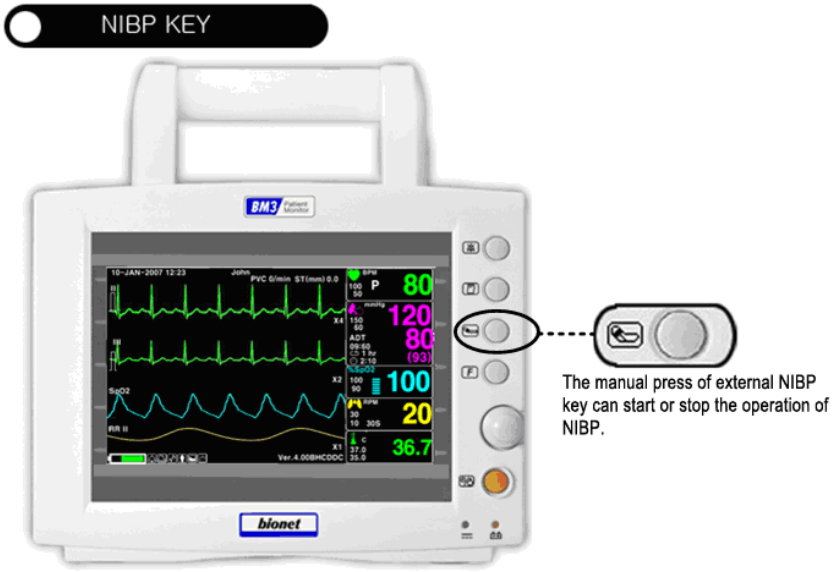
The maintenance is performed every 2 years.

Check the following list to ensure devise operates properly and safely at all times.

1. Check for proper cuff size.
2. Check for residual air left in the cuff from a previous measurement.
3. Make sure cuff is not too tight or too loose.
4. Make sure cuff and heart are at same level, otherwise hydrostatic pressure will offset the NIBP value.
5. Minimize patient movement during measurement.
6. Watch for pulses paradox us.
7. Check for leak in cuff or tubing.
8. Patient may have a weak pulse.

8.2 NIBP Data Window





8.3 NIBP Data Setup

ALARM： A menu to set the Alarm

CUFF SIZE：A menu to select cuff size

UNIT SELECT: A menu to select the pressure unit

INTERVAL ：A menu to set Interval time to measure the blood pressure periodically

INFLATION: Initial Pressurization setting menu

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

ALARM

The alarm provides ALARM LIMIT and ALARM.

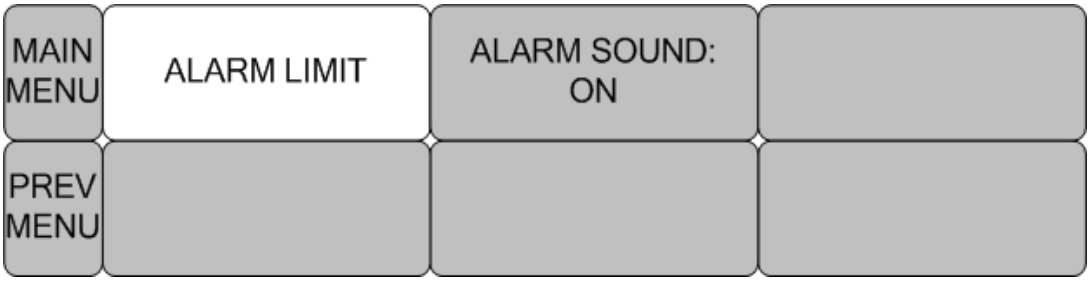
MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

MAIN MENU	ALARM LIMIT	ALARM SOUND: ON	
PREV MENU			

ALARM LIMIT

Alarm setting Numeric Value of Systolic, Diastolic, and mean pressure is 10 ~ 360mmHg.

1. Move the ▸ mark to select one from RETURN, NIBP-S, NIBP-M, or NIBP-D, and press.
2. Press the key at NIBP-S, and move to LOW, and press again.(The user gets the same result regardless of the LOW-HIGH, or HIGH-LOW order.)
3. When the color has changed, move it again to select a target value, and press.
4. Press the key at HIGH. When the color has changed, move to the right to select a target value, and press.
5. Set up or revise the values of NIBP-M and NIBP in the same way as above.
6. With the selection of RETURN, the user can get out of the window.

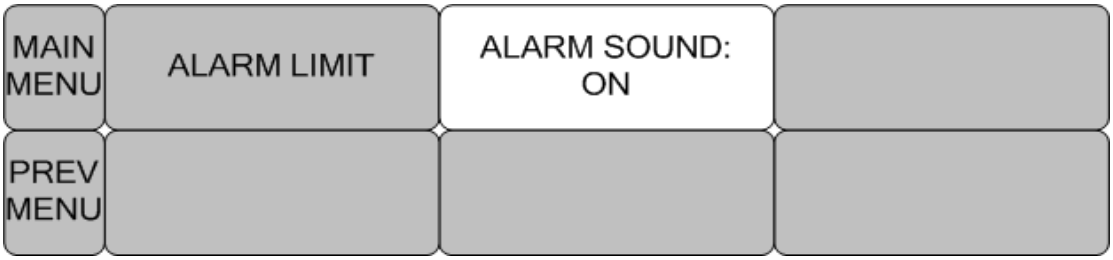


NIBP ALARM LIMIT

RETURN	UNITS	LOW	HIGH
NIBP-S	mmHg	80	200
NIBP-M	mmHg	40	140
NIBP-D	mmHg	20	120

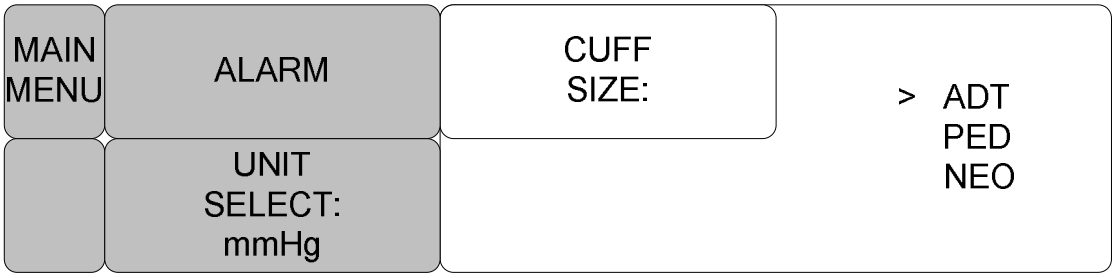
ALARM SOUND

The menu to change the warning sign and message display settings when the respiration alarm is on.



CUFF SIZE

The user can select a CUFF between ADULT and NEONATAL.



UNIT SELECT

It is a function to set blood pressure measurement unit.

The blood pressure measurement unit provides mmHg and kPa.

MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF

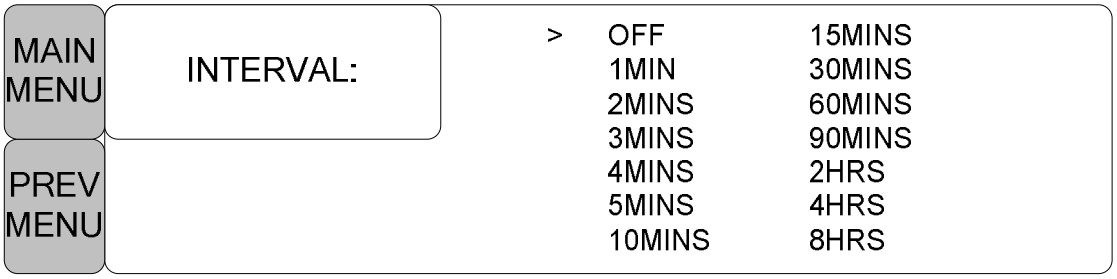
MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: kPa	INFLATION: 170mmHg	INTERVAL: OFF

INTERVAL

This menu is used for selecting intervals when measures the blood pressure automatically.

Select a target interval from 1min, 2, 3, 4, 5, 10, 15, 20, 30, 1hour, 2, 4, 8.

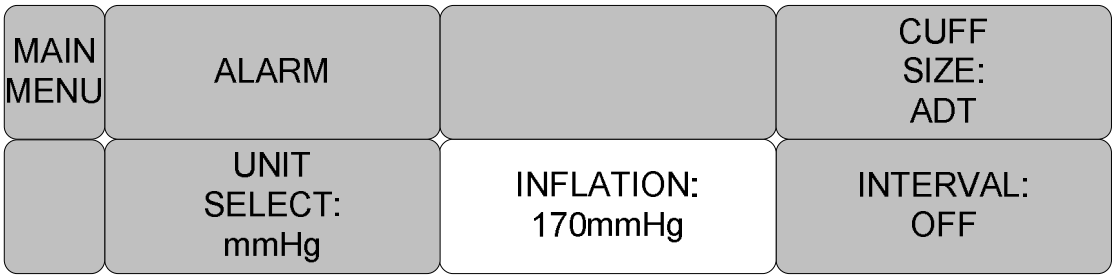
MAIN MENU	ALARM		CUFF SIZE: ADT
	UNIT SELECT: mmHg	INFLATION: 170mmHg	INTERVAL: OFF



INFLATION

It is a function for pressurization pressure.

Numeric value is 80, 100, 120, 140, 160, 180, 200, 220, and 240.



Warning
Pay attention to not block connecting hose when you put cuff on patient.

9. TEMPERATURE

9.1 Outline

Temperature Connector and Measuring Cable

9.2 Temperature Data Window

9.3 Temperature Data Setup

ALARM LIMIT

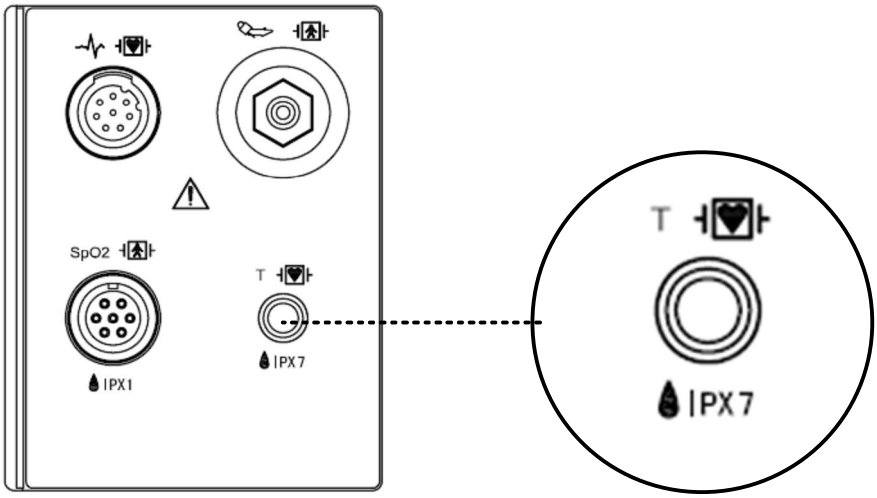
UNIT SELECT

9.1 Outline

This function is used to indicate the changes of resistance generated by the changes of temperature in numbers. The function involves the process of transferring the changes into electric signals.

Temperature Connector and Measuring Cable

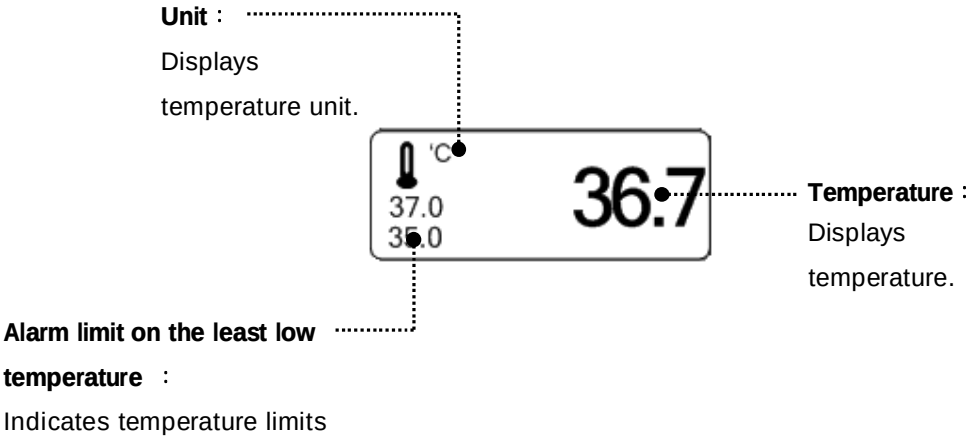
Temperature Connector



Temperature Measuring Cable

Note
Temperature probe is correctly positioned and fixed so as not to disconnect from the patient. Temperature cable is attached to the monitor.

9.2 Temperature Data Window

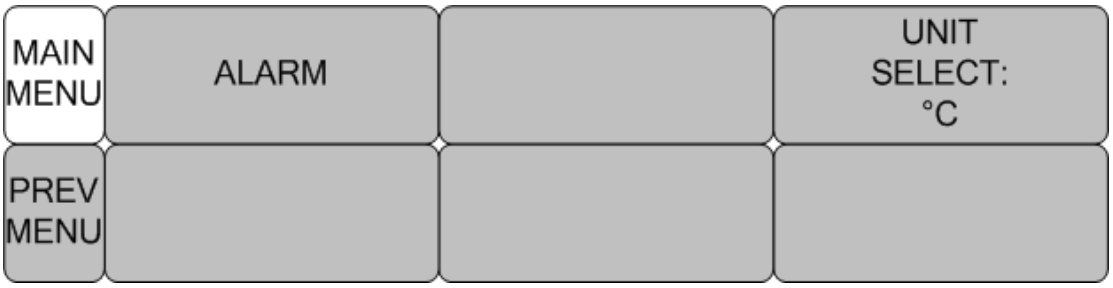


Note
The minimum measuring time required to obtain accurate readings at the specific body site is at least 3 minutes.

9.3 Temperature Data Setup

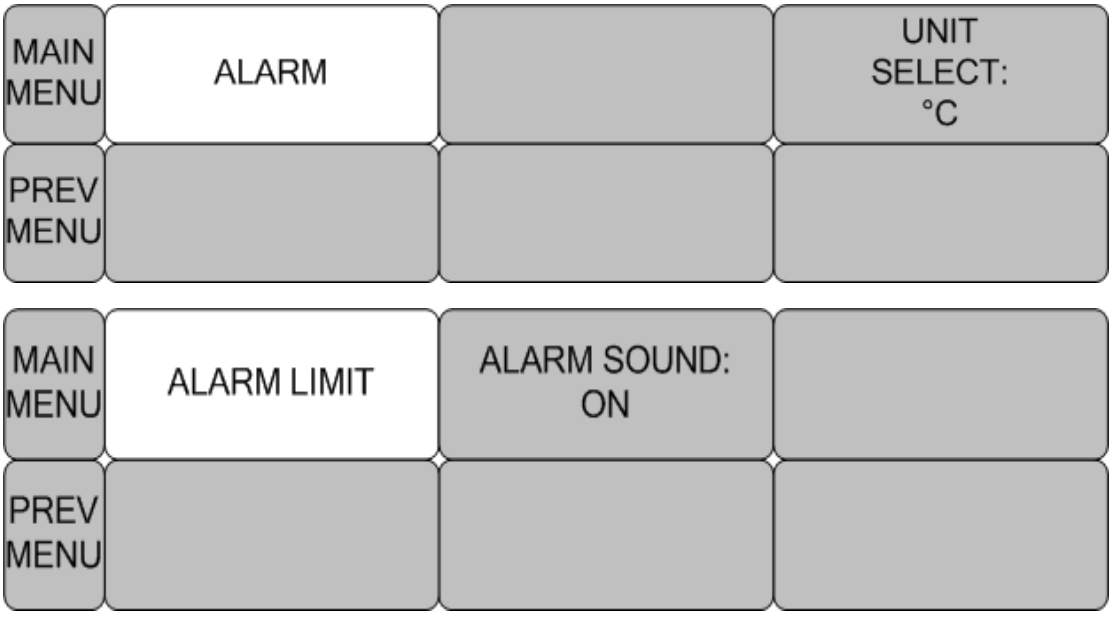
ALARM： Temperature measurement alarm set

UNIT: Temperature measurement unit set



ALARM

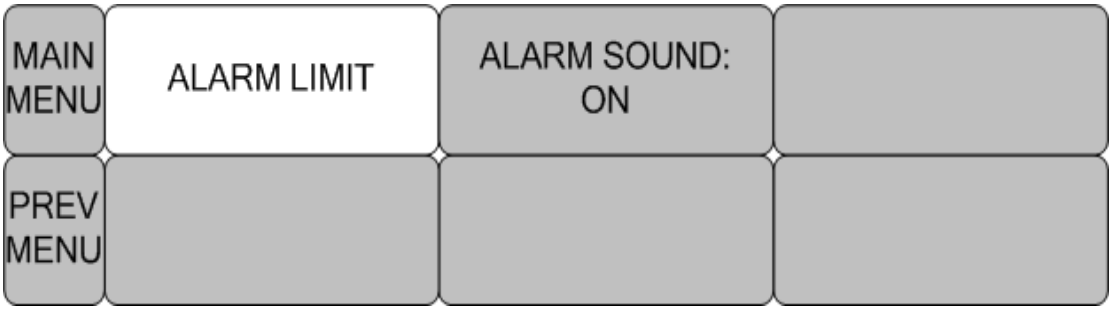
Alarm menu provide ALARM LIMIT and ALARM.



ALARM LIMIT

Setting numeric value is 15.0℃~ 45.0℃

1. Move the ▸ mark to select either RETURN or TEMP, and press.
2. After pressing the cursor at TEMP, move it to LOW, and press.
3. When the color has changed, move the cursor again to select a target value, and press.
4. Move the cursor to HIGH and press. After the color has changed, move the cursor again to select a target value, and press. (One may choose HIGH first to get the same result.)
5. Select RETURN to get out of the menu.

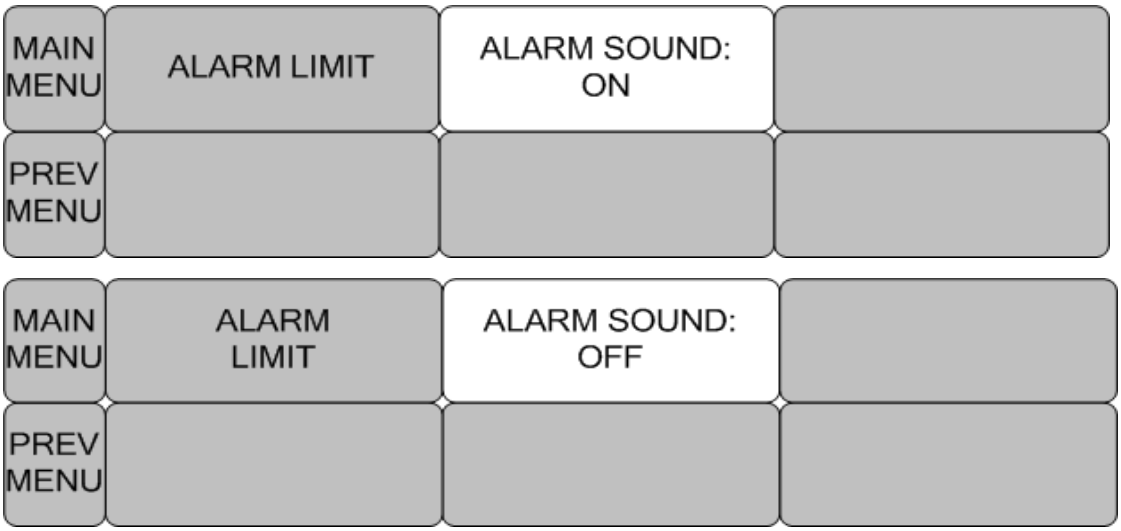


TEMP ALARM LIMIT

RETURN	UNITS	LOW	HIGH
TEMP	°C	30.0	42.0

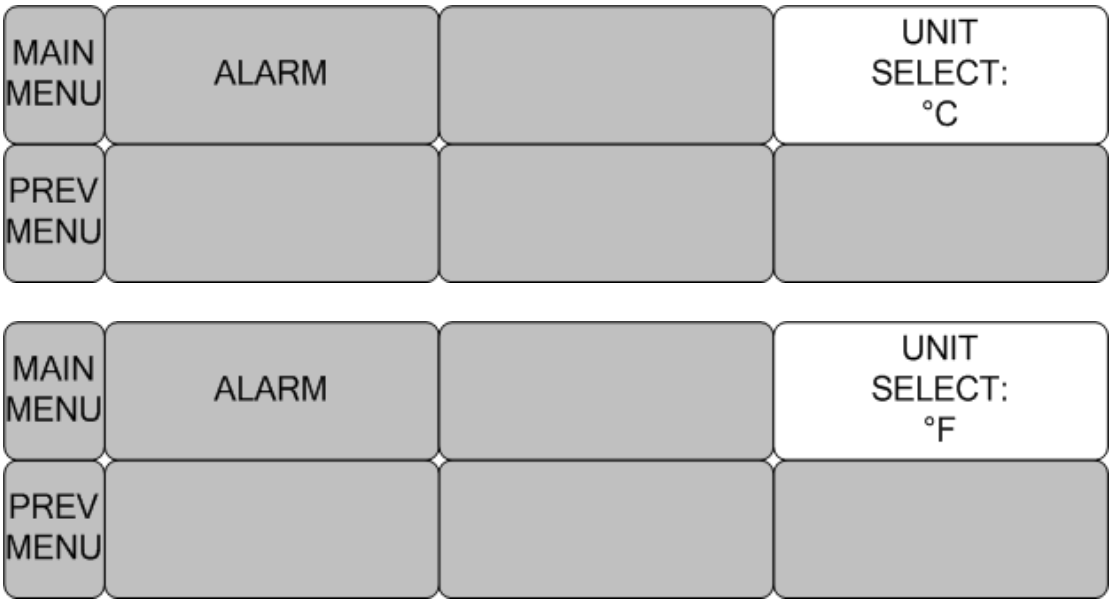
ALARM SOUND

The menu to set warning sign and message display when the temperature alarm is on.



UNIT SELECT

Able to select either °C or °F.



10. PRINT

10.1 Print

Printer and Heat Sensitivity Paper

Function and Setup Menu

10.2 Paper Change

10.1 Print

Printer and Heat Sensitivity Paper

A printer used to print data onto thermal paper, this product is offered as an option.

Size of the thermal paper roll: 580mm wide x 380mm in diameter. Any thermal paper of same size can be used for the printer.

Side View of Printer

Function and Setup Menu

MAIN MENU	PRINTER SPEED: 25mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM2: SPO2	WAVE FORM3: RESP	

1. Press the PRINT Key for continuous printing.

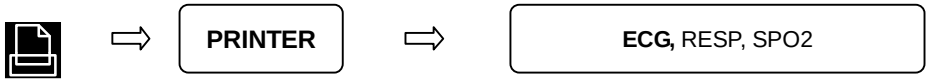
2. Select Printing Speed 25, 50 mm/s.

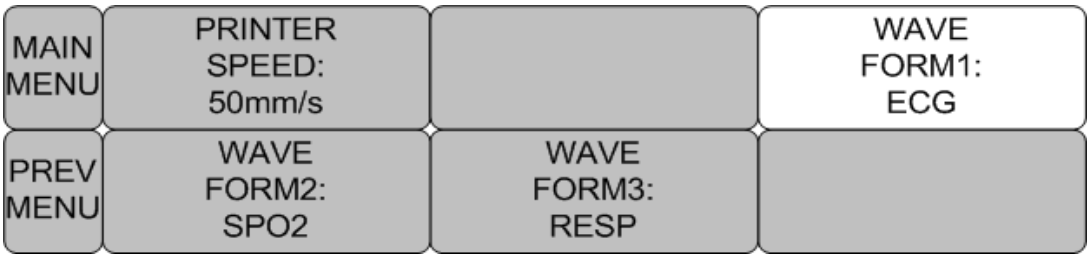
MAIN MENU	PRINTER SPEED: 25mm/s		WAVE FORM1: ECG
PREV MENU	WAVE FORM2: SPO2	WAVE FORM3: RESP	

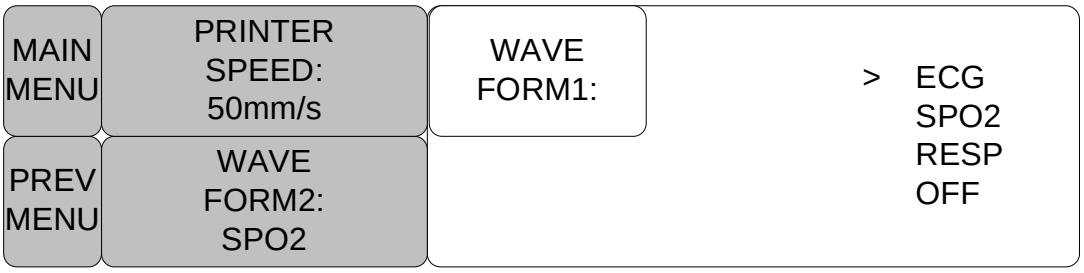
MAIN MENU	PRINTER SPEED: 50mm/s	WAVE FORM1	WAVE FORM2
PREV MENU	WAVE FORM3		

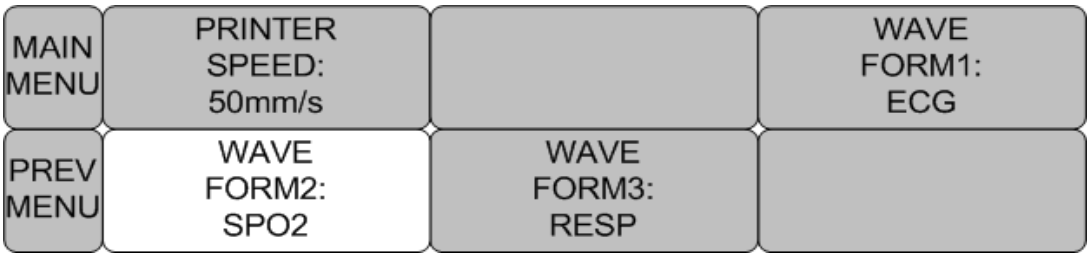
3. Set up ALARM PRINT in the MORE menu to activate printing during. ALARM.

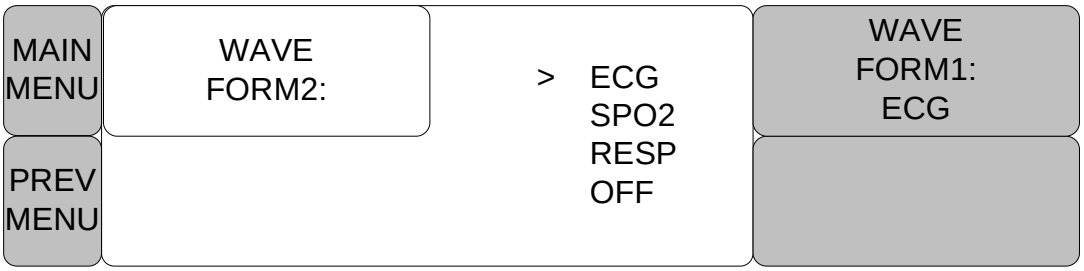
4. Data is printed in a selected wave form along with personal information of the patient.
   3 channels select 3 parameters to print.

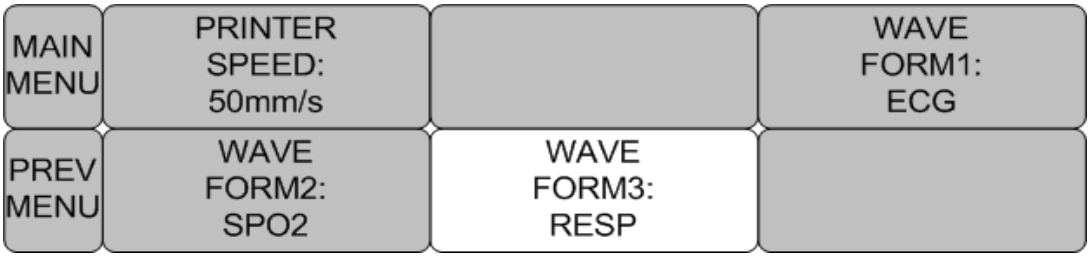


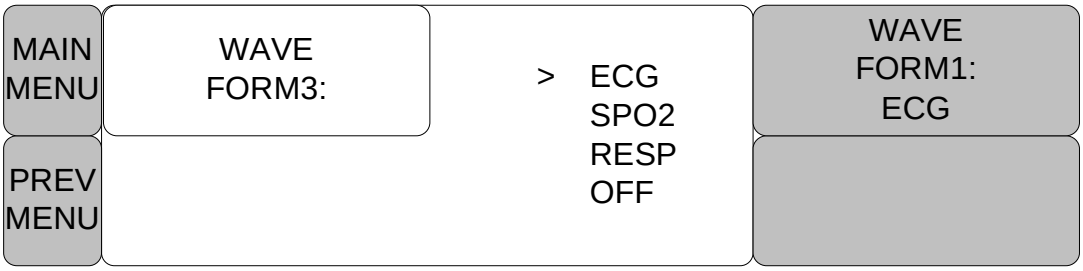

MAIN MENU
PRINTER SPEED: 50mm/s
WAVE FORM1: ECG
PREV MENU
WAVE FORM2: SPO2
WAVE FORM3: RESP


MAIN MENU
PRINTER SPEED: 50mm/s
WAVE FORM1:
> ECG
SPO2
RESP
OFF
PREV MENU
WAVE FORM2: SPO2


MAIN MENU
PRINTER SPEED: 50mm/s
WAVE FORM1: ECG
PREV MENU
WAVE FORM2: SPO2
WAVE FORM3: RESP


MAIN MENU
WAVE FORM2:
> ECG
SPO2
RESP
OFF
WAVE FORM1: ECG
PREV MENU


MAIN MENU
PRINTER SPEED: 50mm/s
WAVE FORM1: ECG
PREV MENU
WAVE FORM2: SPO2
WAVE FORM3: RESP


MAIN MENU
WAVE FORM3:
> ECG
SPO2
RESP
OFF
WAVE FORM1: ECG
PREV MENU

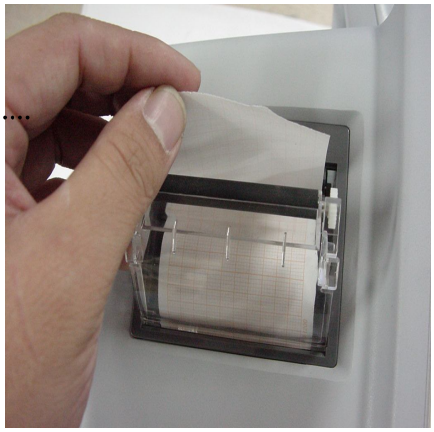
10.2 Paper Change

1

Open the window of the printer.

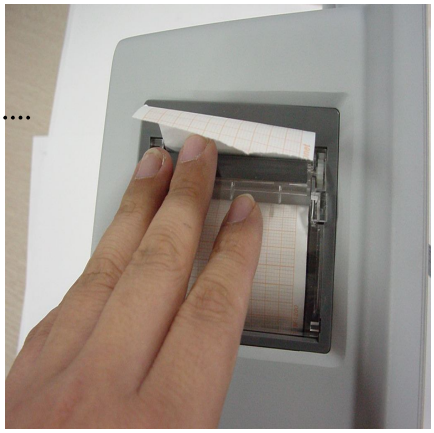
2

Insert the paper roll offered with the product into the printing unit. Place the roll in a proper way so that the printed paper can rolls out from the top of the roll.



3

Press the printer window until it is properly shut. Incomplete closure may cause failure in printing.



11. MESSAGE LIST

Function	Message	Details
ECG	LEAD FAULT	Cable is not properly connected.
SpO_2	CHECK PROBE LEAD FAULT	Patient's finger is off the probe. Cable is not properly connected.
RESP	LEAD FAULT	Cable is not properly connected.
NIBP	INFLATION FAILURE CHECK CUFF OVER PRESSURE DEFLATION FAILURE OVER TIME CUFF PRESSURE MEASUREMENT ERROR	Cuff hose is not properly connected. Cuff pressure is putting on excessively. Cuff is bent, preventing deflation. Measure time exceeds the preset Level. Measure signal absent
TEMP	LEAD FAULT	Cable is not properly connected.
ALARM	ALARM VOL.OFF SILENCED ALARM PAUSE 5MIN	Alarm volume is off. Alarm key is pressed once Alarm key is pressed twice
TREND	NO PATIENT DATA	No patient's data input.
PRINT	NO PAPER	No paper in the printer
SETUP	BATTERY LOW	Low battery

12. DEFAULT SETTING VALUE

1. Adult-ICU Mode

Alarm level

	High	Medium	Low	Message
Asystole	0			
Vfib/VTac	0			
V Tach	0			
HR		0		
NIBP		0		
SpO_2			0	
SpO_2-Rate				0
RR				0
T(˚C)				0

Parameter Limits

	Low	High
HR	50	150
NIBP-S	80	200
NIBP-M	40	140
NIBP-D	20	120
SpO_2	90	100
SpO_2-Rate	50	150
RR(RESP)	10	30
T(˚C/˚F)	30.0/42.0	86.0/107.6

Display

Patient Age	**Adult**
Color format	**Color**
Primary ECG	**II**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Low Alarm**
SpO_2 Probe Off	**Low Alarm**
Units for Height	**Cm**
Units for Weight	**Kg**
Temperature Units	**°C**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

2. Neonate-ICU Mode

Alarm level

	High	Medium	Low	Message
Asystole	0			
Vfib/VTac	0			
V Tach	0			
HR		0		
NIBP		0		
RR				0
T(°C)				0

Parameter Limits

	Low	High
HR	90	200
NIBP-S	40	100
NIBP-M	30	70
NIBP-D	20	60
RR(RESP)	15	100
T(°C/°F)	30.0/42.0	86.0/107.6

Display

Patient Age	**0~2 years**
Color format	**Color**
Primary ECG	**II**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**Neonate**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Low Alarm**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

3. Pediatric-ICU Mode

Alarm level

	High	Medium	Low	Message
Asystole	0			
Vfib/VTac	0			
V Tach	0			
HR		0		
NIBP		0		
SpO_2			0	
SpO_2-Rate				0
RR				0
T(˚C)				0

Parameter Limits

	Low	High
HR	70	180
NIBP-S	60	160
NIBP-M	40	120
NIBP-D	30	100
SpO_2	90	100
SpO_2-Rate	70	180
RR(RESP)	10	50
T(˚C/˚F)	30.0/42.0	86.0/107.6

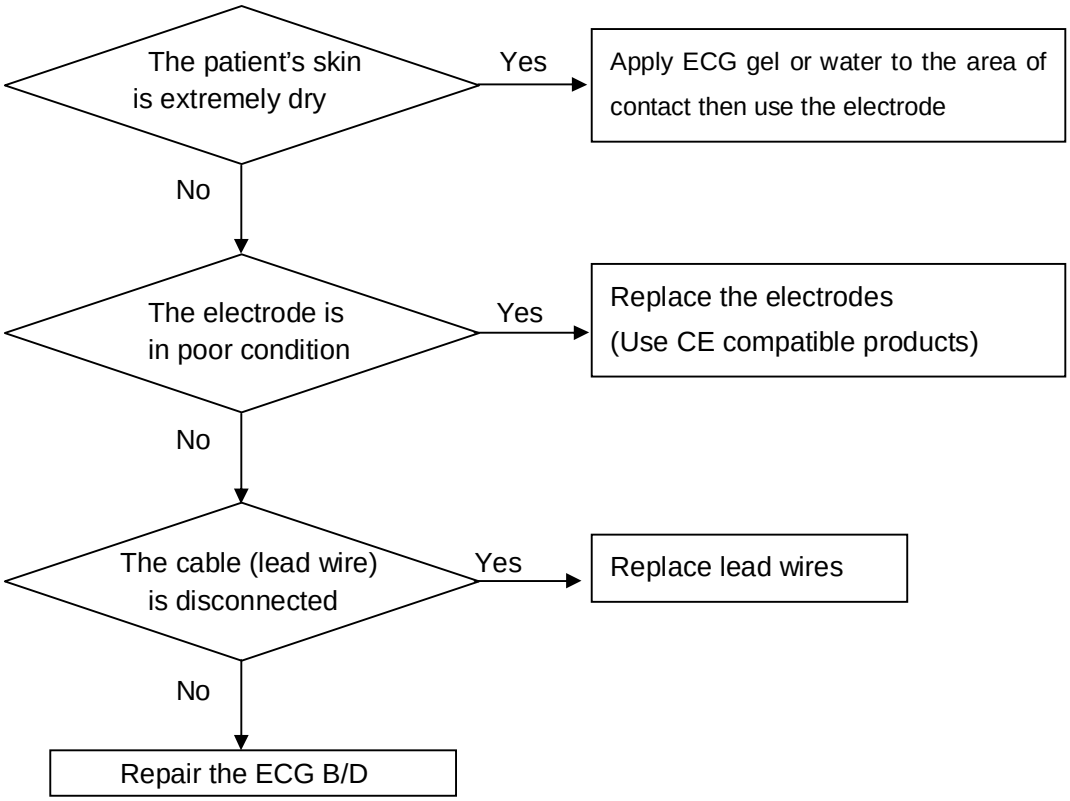
Display

Patient Age	**Adult**
Color format	**Color**
Primary ECG	**II**
Detect Pace	**Off**
Print Waveform2	**Off**
Print Waveform3	**Off**
Alarm Print	**On**
NIBP Auto	**Off**
NIBP Cuff Size	**Adult**
RR(RESP) Lead	**II**
Alarm Volume	**50%**
QRS Volume	**Off**
Pulse Volume	**Off**
ECG Lead Fault	**Low Alarm**
SpO_2 Probe Off	**Low Alarm**
Units for Height	**cm**
Units for Weight	**kg**
Temperature Units	**°C**
NIBP Limit Type	**Systolic**
ECG Filter	**Monitoring**

13. TROUBLE SHOOTING

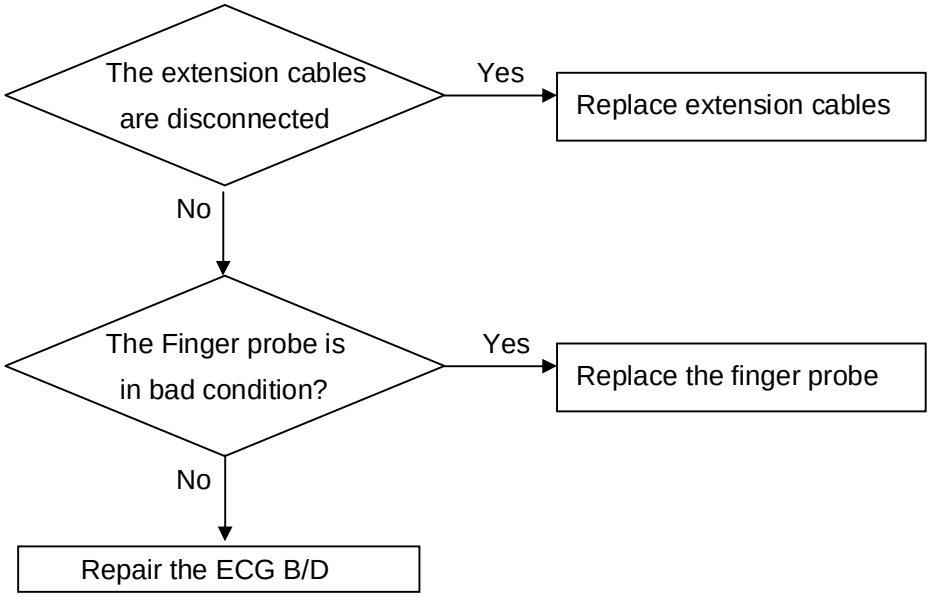
1. Noise in ECG

- Gel is dry
- Electrodes do not stick well to skin

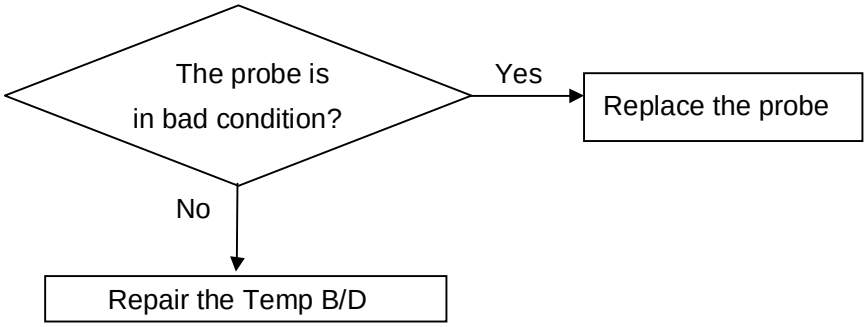

The patient's skin is extremely dry
Yes
Apply ECG gel or water to the area of contact then use the electrode
No
The electrode is in poor condition
Yes
Replace the electrodes (Use CE compatible products)
No
The cable (lead wire) is disconnected
Yes
Replace lead wires
No
Repair the ECG B/D

2. SpO_2 malfunction

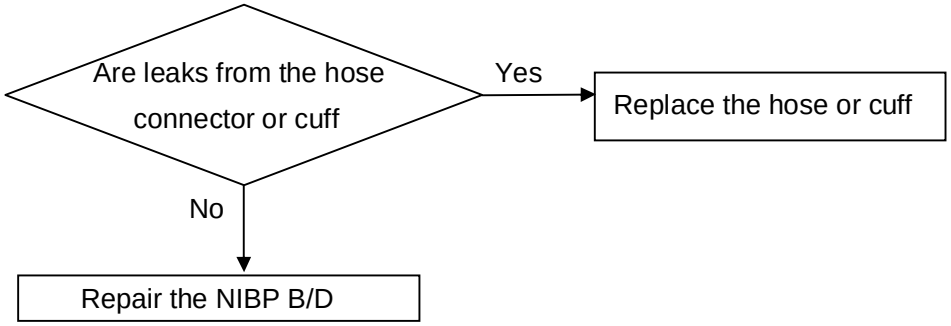
Connectors are in bad condition?



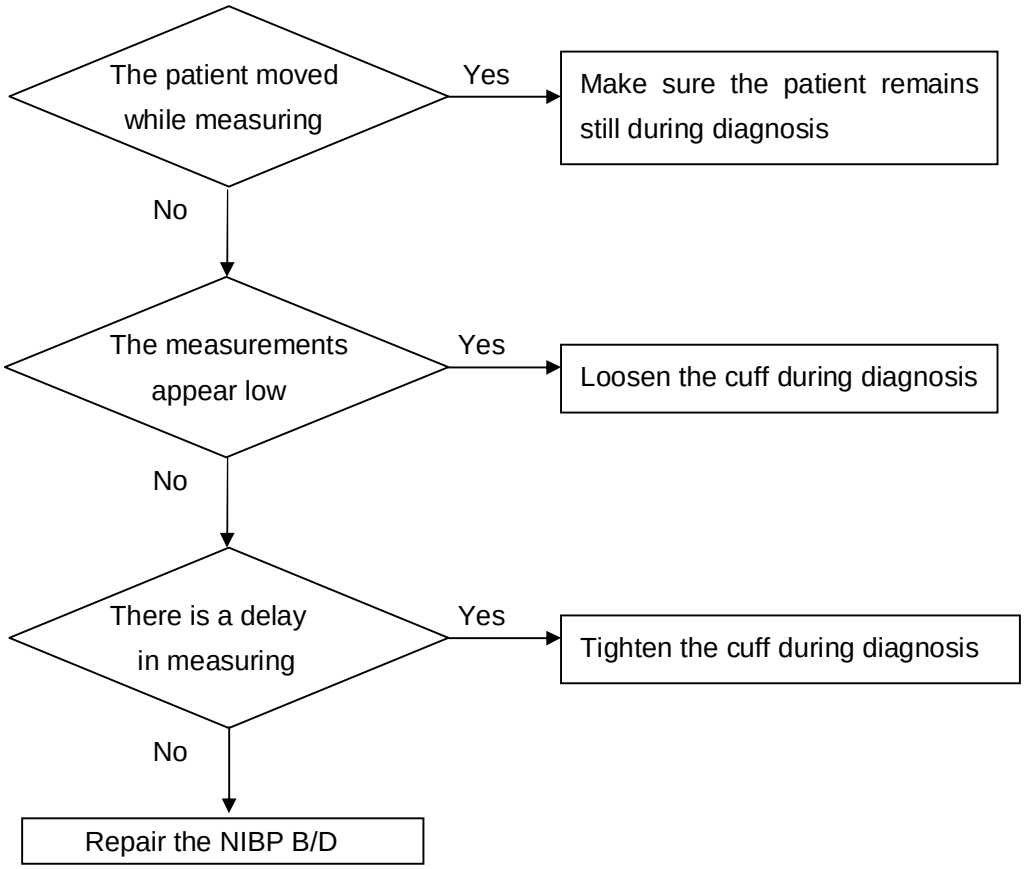
3. Temp malfunction



4. NIBP malfunction

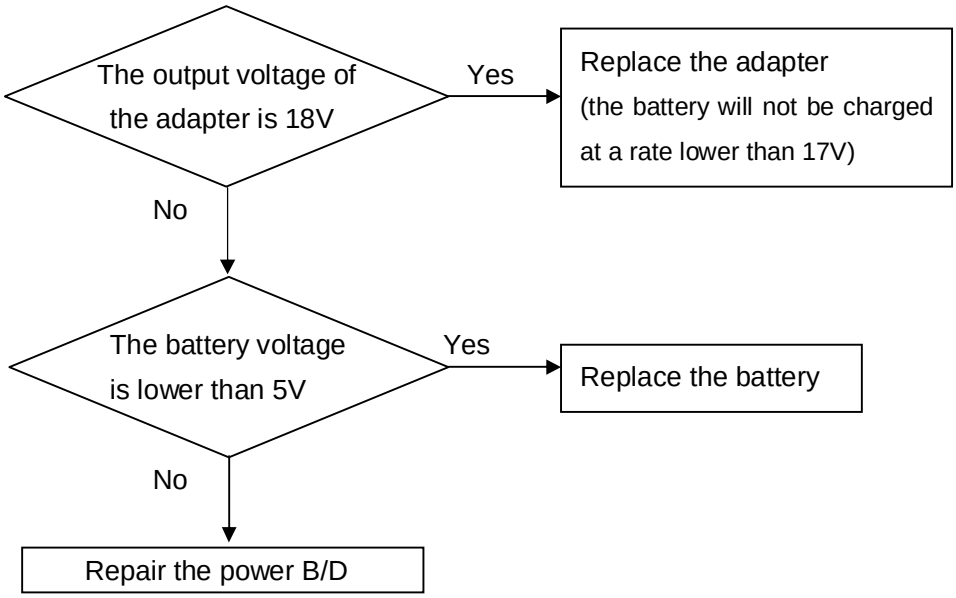


5. Abnormality in NIBP measurements

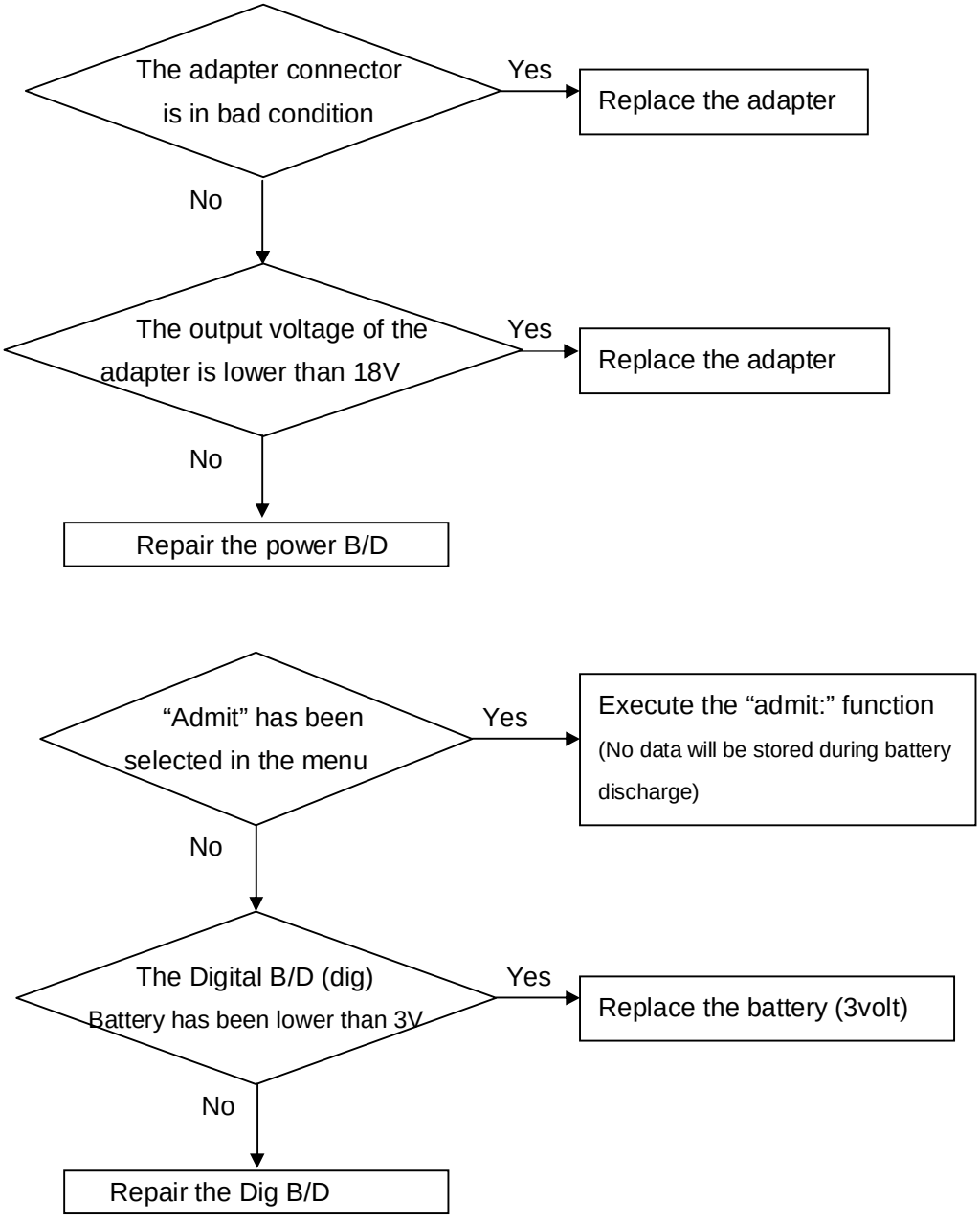


6. Failure in battery recharge

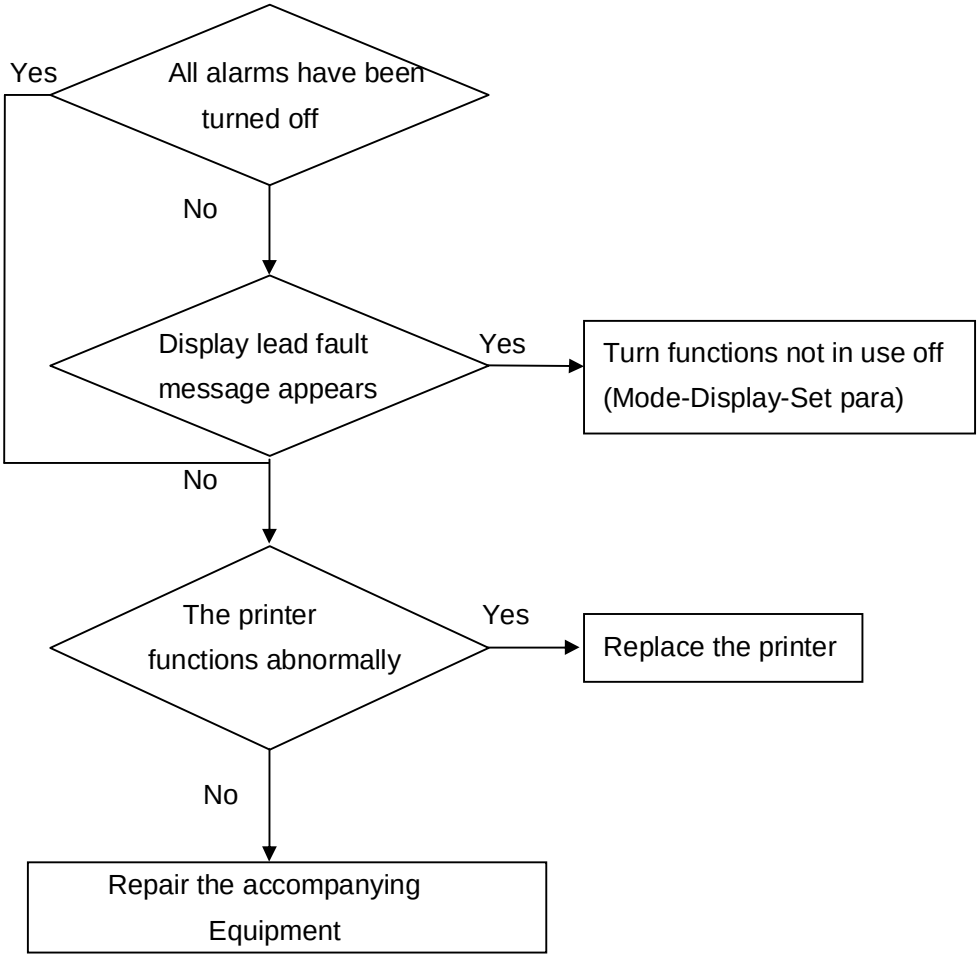
(The battery does not fully recharge in 6 hours or more)


The output voltage of the adapter is 18V
Yes
Replace the adapter (the battery will not be charged at a rate lower than 17V)
No
The battery voltage is lower than 5V
Yes
Replace the battery
No
Repair the power B/D

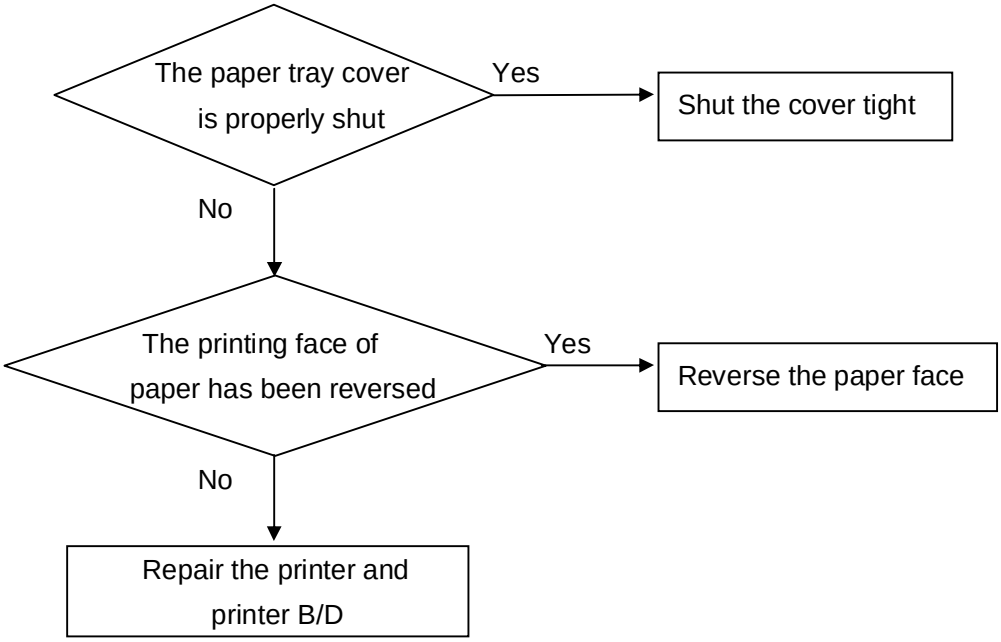
7. Power failure



8. Periodic noises



9. Print failure



14. SPECIFICATION

Ease of use

Customization

Special Features

Monitor Environmental Specifications

Power adaptor

Monitor Performance Specifications

Graphical and Tabular Trends

SpO2 Performance Specifications

Respirations Performance Specifications

NIBP Performance Specifications

ECG Performance Specifications

Temperature Unit Performance Specifications

Accessories included

OPTION

Ease of use

· Battery operation

· Attached printer

· Table and graphic trend

· Nellcor SpO_2 sensor interchanges

Additional Function

· LAN Connection

Monitor Environmental Specifications

· Operating Temperature： 10°C to 40°C (50°F to 104°F)

· Storage Temperature： - 10°C to 60°C (14°F to 140°F)

· Humidity： 20% to 95% RH

· Operating Attitude： 70(700) to 106Kpa(1060mbar)

Power

· AC 100-240V (50/60Hz)

· Adapter 18 V, 2.5 A

Monitor Performance Specifications

· Screen： 7" TFT LCD (800×480)

· Indicators

- Up to 3 wave patterns
- 3 levels of alarm sound
- Visual alarm
- Pulse sound
- handle flashing
- Battery status
- LED external power supply LED

· Interfaces

- Generating power for LAN, Wireless LAN : 5.0V max 0.9A

· Battery

- Li-ion battery

- Battery status display
- Operating time：2hours(with fully charged Battery)

· Thermal Printer(Optional)：internal printer

- Speed：25, 50 mm/sec
- Paper width：58 mm

Graphical and Tabular Trends

· Table Trend

- Memory Storage：128 hours
- Data Interval：1 minute
- Display Interval：1MIN, 5, 15, 30, 1HR

· Graphical Trend

- Display Period：30MINS, 60, 90, 3HRS, 6, 12

ECG capacity

· Lead :	3,5
· pulse rate range：	30 to 300 bpm
· pulse accuracy：	±3 bpm
· Bandwidth：	0.5 Hz to 40 Hz
· Display Sweep Speed：	2 5mm / sec
· ECG size (Sensitivity)：	0.5, 1, 2, 4 mV/cm
· Lead-off Detection with display indicator	
· Pace maker Detection Mode	
· Differential Input Impedance：	> 5 MΩ
· Common Mode Rejection Ratio：	> 90 dB at 50 or 60 Hz
· DC Input Range：	±5 mV
· Defibrillator Discharge：	< 5s
· Defibrillation Artifact Recovery Time：	< 8s

SpO_2 capacity

· Saturation Range：	0% to 100% oxygen proportion
· Pulse Rate Range：	30 to 254 bpm
· SpO_2 accuracy：	70% to 100% ±2 digits, 0% to 69% unspecified
· pulse accuracy：	±2 bpm

· Sensor Red 660nm, 2mW (typical)
Infrared 905nm, 2-2.4mW (typical)
· Minimum Signal: 0.05% modulation (Low perfusion level performance and
Amplitude limitation validation using FLUKE Index 2 Oximetry Simulator)

Respiration Performance Specifications

· Range： 5 to 120 breaths/min
· Accuracy： ±3 breaths/min
· Display Sweep Speeds：25mm/sec

NIBP capacity

· Technique： Oscillometric
· Measurement mode:
- Manual： Single Measurement
- Auto： automatic Intervals of 1MIN, 2, 3, 4, 5, 10, 15, 20, 30, 1HR, 2, 4, 8
· Pressure Display： 0 to 300 mmHg
· Blood Pressure Measurement Range:
- Adult ：Systolic Pressure Range : 50 to 260mmHg
Mean Pressure Range : 30 to 220mmHg
Diastolic Pressure Range : 20 to 200mmHg
- Pediatric ：Systolic Pressure Range : 50 to 230mmHg
Mean Pressure Range : 30 to 190mmHg
Diastolic Pressure Range : 20 to 170mmHg
- Neonate ：Systolic Pressure Range : 50 to 120mmHg
Mean Pressure Range : 30 to 100mmHg
Diastolic Pressure Range : 20 to 90mmHg

Temperature Unit Performance Specifications

· Range ： 15°C to 45°C (59°F to 113°F)
· Accuracy ： 25°C to 45°C ± 0.1°C, 15°C to 24°C±0.2°C
· Sensor : YSI 400 Series compatibility

Accessories Included:

· 3Lead patient cable (3CBL-400, 3WIRE-400)	1 EA
· ECG extension cable	1 EA
· Electrodes (ECG SENS - 400)	10 EA
· NIBP extension tube (NBPCBL-400)	1 EA
· adult cuff, 25-35Cm (ACUFF-400)	1 EA
· SpO2 extension Cable (SPCBL-400)	1 EA
· Reusable Adult SpO2 Sensor (SPASENS-400)	1 EA
· DC adapter, 18VDC, 2.5A (MW160 Made in AULT Co., Ltd.)	1 EA

Option

· Temperature sensor (skin) (TEMPSENS-400)	
· Printer Paper (PAPER-400)	
· 5 lead patient cable (5CBL-400, 5WIRE-400)	
· Reusable Multi-site "Y" SpO2 Sensor (SPASENS-430)	1 EA
· Disposable Adult SpO2 Sensor (D-MDNA)	1 EA

PRODUCT WARRANTY

Product Name	**Patient Monitor**
Model Name	**BM3Plus**
Approval Number	
Approval Date	
Serial Number	
Warranty Period	**2 years from date of purchase**
Date of Purchase	
Customer Section	**Hospital Name :** **Address :** **Name :** **Phone :**
Sales Agency	
Manufacturer	

* Thank you for purchasing BM3Plus.

* The product is manufactured and passed through strict quality control and through inspection.

* Compensation standard concerning repair, replacement, refund of the product complies with "Consumer's Protection Law" noticed by Economic Planning Dept.

BIONET CO., LTD.

Product Name: BM3Plus